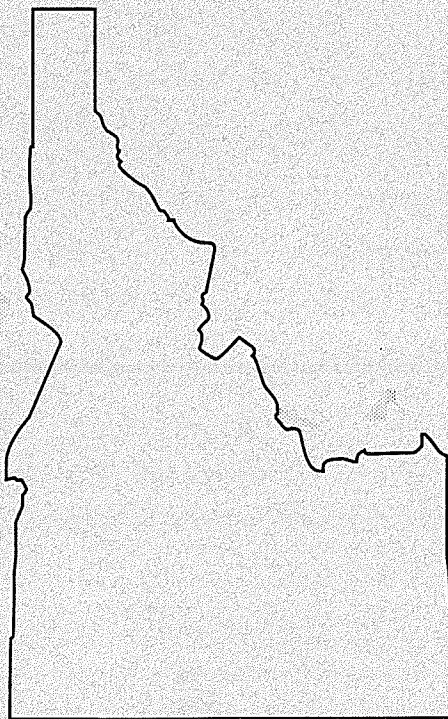




1996 Water Body Assessment Guidance

A Stream to Standards Process

State of Idaho Division of Environmental Quality



1996 Water Body Assessment Guidance

A Stream to Standards Process

August 27, 1996

Prepared for
State of Idaho

by
Idaho Division of Environmental Quality
Community Services Division
Watershed Monitoring and Analysis Bureau



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Executive Summary

In 1993, the Idaho Sportsmen's Coalition and the Idaho Conservation League filed a complaint for declaratory judgement and injunctive relief in the Federal District Court challenging the U.S. Environmental Protection Agency was not fulfilling the mandates of the Clean Water Act in designating water quality-limited water bodies in Idaho. The judge ruled the U.S. Environmental Protection Agency was arbitrary and capricious in their decisions. The Court ordered the U.S. Environmental Protection Agency to promulgate a list of 962 water quality-limited water bodies in the state.

Idaho responded to this action by establishing a Technical Review Committee. The committee's task is to direct development of a non-arbitrary water body assessment method.

The Water Body Assessment Guidance is the culmination of their efforts. An assessor uses chemical, physical, and biological data in determining the level to which beneficial uses are being supported in a particular water body. The guidance also incorporates a beneficial use attainability designation process for unclassified waters. The document illustrates how these assessments will be made. The Idaho Division of Environmental Quality will be the only agency making beneficial use support status and attainability determinations. Both of these determinations can be appealed.

The Water Body Assessment Guidance also outlines a process the state will use in listing water quality-limited water bodies and designating beneficial uses. Idaho Code §39-3601 provides the mechanism to make this happen. This legislation focuses on watersheds as the level where water quality decisions are made, thereby providing a basis for cost-effective water quality management. Candidate water quality-limited water bodies and designated uses are submitted to Basin Advisory Groups and reviewed through their public involvement provisions. The Basin Advisory Groups will prioritize water bodies and make recommendations to the Idaho Division of Environmental Quality.

Introduction

Background

In 1972, Congress passed public law 92-500, Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA). The goal of this act is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” (Water Pollution Control Federation 1987). The act and the programs it generated have changed over the years as experience and perceptions of water quality have changed. It has been amended 15 times, most significantly in 1977, 1981, and 1987. The Federal Government, through the U.S. Environmental Protection Agency (EPA), assumed the dominant role in defining and directing water pollution control programs across the country. The Idaho Division of Environmental Quality (DEQ) is the state agency responsible for implementing the CWA in Idaho. The EPA oversees Idaho and certifies the state is fulfilling the requirements and responsibilities of the CWA.

One of the goals of the 1977 amendment was protection and management of waters to insure “swimmable and fishable” conditions. This, coupled with the original goal of restoring and maintaining the chemical, physical, and biological integrity, relates water quality with more than just chemistry. The CWA recognizes water quality has three major components: (1) chemical; (2) physical; and (3) biological, which is dependent on the former two. Section 303(c)(2)(B) of the CWA states, “...such States shall adopt criteria based on biological monitoring or assessment methods”. Section 304(a)(1) of the CWA states, “States shall develop and publish criteria for water quality accurately reflecting the latest scientific knowledge... on the effects of pollutants on biological community diversity, productivity, and stability...”.

Water quality standards are legally established rules consisting of two parts; designated uses and criteria. Designated uses are those beneficial uses listed in the *Water Quality Standards and Wastewater Treatment Requirements* (Idaho Department of Health and Welfare n.d.a). Criteria are the conditions presumed to support or protect the designated uses (Karr 1991). This dual nature of water quality standards demands an assessment of beneficial use attainability and status in addition to the classic evaluation of criteria.

In 1993, the DEQ embarked on a pilot program aimed at integrating chemical, physical, and biological assessments as a way of characterizing water quality and the integrity of wadable streams (McIntyre 1993). The pilot program has since evolved into the Beneficial Use Reconnaissance Project (BURP). This project is a reconnaissance level monitoring program with primary focus on biological and physical habitat measures (Idaho Division of Environmental Quality 1995, 1996). The objectives are:

- to determine beneficial use attainability; and
- to determine beneficial use status.

Purpose

The Water Body Assessment Guidance was developed to provide a non-arbitrary water body assessment method using data collected by the BURP and other similar sources. It was designed as an analytical tool for

determining if a water body was supporting or not supporting a beneficial use. It can be used to prioritize water bodies for more stringent assessments and recommend candidate beneficial uses.

The strength of this method is the use of ecological indicators to make water quality assessments. A water body's water quality gets evaluated and compared to water quality levels needed for the protection and maintenance of viable communities of aquatic species. Measurements of aquatic assemblages better reflect long term stream conditions than instantaneous chemical measurements. Biological assessment also provides a direct measure of the aquatic life beneficial uses.

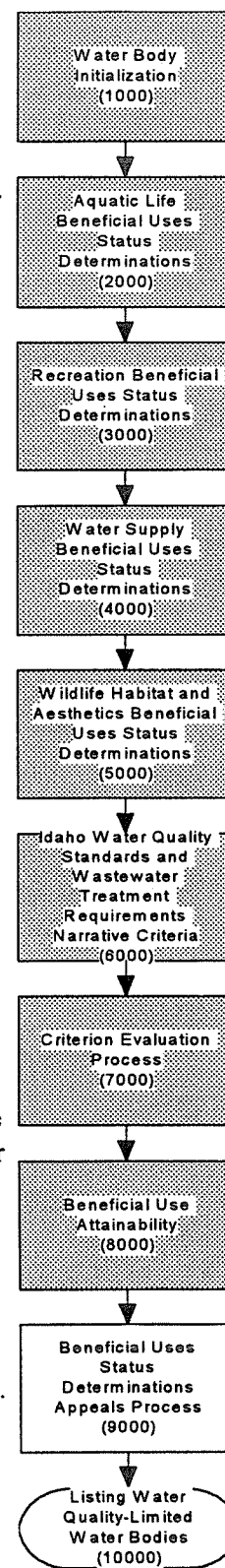
Secondarily, the water body assessment method may help identify causes and sources of beneficial use impairment. For example, good physical indicators and poor biological indicators may be attributed to water chemistry factors. Dominance by a particular macroinvertebrate may indicate tolerance to organic pollution. Poor physical indicators and good biological indicators may indicate nutrient enrichment, which would artificially sustain a more diverse fauna than dictated by the habitat quality.

Finally, this guidance provides state wide consistency to water body assessment. The document illustrates the existing method to non-arbitrarily assess Idaho's water bodies. The method is dynamic. It will be adapted to meet new needs as better assessment methods are developed and changes to the *Water Quality Standards and Wastewater Treatment Requirements* occur.

How to Use the Document

The Water Body Assessment Guidance is organized similarly to the code of a computer program. Flow charts are used to break the assessment down into many easily answered questions. Processes are represented by rectangle shaped boxes, decisions by diamond shapes, and documentation by polygons. Shaded flow chart objects represent multiple steps found in other (sub) flow charts. Flow chart arrows represent logical progression. A flow chart process and documentation will have a single arrow pointing in and a single arrow pointing out. A flow chart decision will have a single arrow pointing in and two or three arrows pointing out. The number in each flow chart object corresponds with narrative in the text. The text portion may be used without the accompanying flow chart by following the instructions after the arrow symbol (-). A pencil symbol (✎) indicates a need to record findings.

There are several reasons for the document organization. The strongest reason is this type of organization (top down, flow chart) incorporates and documents all of the details. This organization also allows this methodology to be easily incorporated into an electronic format. An electronic version would make it easier for assessors to apply it consistently and record results.



It is recommended the assessor have the following items available when conducting a water body assessment:

- materials needed to identify the water body (see process 1100);
- data resulting from sampling the water body (e.g. BURP);
- a copy of the *Water Quality Standards and Wastewater Treatment Requirements* (Idaho Department of Health and Welfare n.d.a);
- calculated ecological indicators (Appendices A-E);
 - a. DEQ Macroinvertebrate Biotic Index
 - b. DEQ Habitat Index
 - c. DEQ Reconnaissance Index of Biotic Integrity
 - d. DEQ Index of Biotic Integrity
 - e. DEQ Algal Biotic Index
- fish length frequency distribution;
- *Protocols for Conducting Use Attainability Analyses for Determining Beneficial Uses to be Designated on Idaho Stream Segments* (Maret and Jensen 1991); and
- a photocopy of the DEQ Water Body Assessment Form (Appendix F) to record findings.

Parts of the Water Body Assessment Guidance are contingent on the DEQ assumptions found in Appendix G. Each assumption has been proposed to the DEQ Director for concurrence.

Limitations

The Water Body Assessment Guidance is limited to wadable lotic water bodies and applies to both reconnaissance and more intensive level monitoring. The fundamental approach should be applicable to large streams, lakes, reservoirs, springs, and wetlands but must be further investigated and have an assessment method like the BURP developed.

Other data sources can be used in the Water Body Assessment Guidance. It is the assessor's responsibility to document and justify variations if a different assessment method is used.

Water Body Initialization (1000)

The first step in the Water Body Assessment Guidance is to initialize, or set starting values, for the water body being assessed. These include identifying the water body with finite boundaries, recording designated beneficial uses, and determining and recording existing beneficial uses.

Identify Water Body for Assessment (1100)

This process identifies the boundaries of the water body being assessed. Currently, there are several water body referencing systems. A state wide standard georeferenced water body referencing system is being

developed. Until it is completed, any of the following water body referencing systems can be used:

- *Water Quality Standards and Wastewater Treatment Requirements sections 110. through 160. and 299.* (Idaho Department of Health and Welfare n.d.a);
- Pacific Northwest Rivers Numbering System (Zaroban 1993); or
- the EPA's River Reach File (Bonneville Power Association 1986).

The U.S. Geological Survey Geographic Names Information System (U.S. Geological Survey 1995) can be used if the water body is not described in one of the above referencing systems. The eight digit Hydrologic Unit Code may be determined and incorporated with the upstream and downstream boundaries.

- ✎ Record the water body name and the referencing system's accompanying code in the appropriate cells on the DEQ Water Body Assessment Form (Appendix F) when using one of the above mentioned water body referencing systems. Also record upstream and downstream boundaries.

→ Go to process 1200.

Record Designated Beneficial Uses (1200)

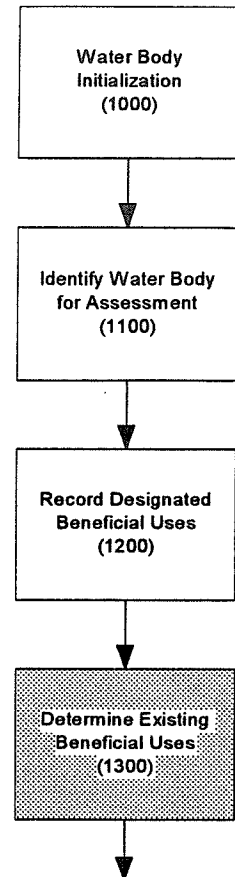
This process records the designated beneficial uses for the water body being assessed. Designated beneficial uses or designated uses are those uses assigned to classified waters in the *Water Quality Standards and Wastewater Treatment Requirements sections 110. through 160. and 299.* (Idaho Department of Health and Welfare n.d.a). Waters not classified are designated as Primary Contact Recreation, unless physical characteristics of the water body precludes the use. Note Industrial Water Supply, Wildlife Habitat, and Aesthetics are designated for all water bodies in the state.

- ✎ Record the water body's designated uses by marking an "X" in the appropriate cell in the Designated Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F). The appropriate aquatic life use, Cold or Warm Water Biota, will also need to be identified.

→ Go to decision 1311.

Determine Existing Beneficial Uses (1300)

Existing beneficial uses or existing uses are those uses presently existing in the water body and those uses existing in the water body on or after November 28, 1975, although they may not be existing now. This is the date states were required to incorporate water quality rules and regulations after the inception of the CWA. There is no need to evaluate or document whether Industrial Water Supply, Wildlife Habitat, and Aesthetics are existing as they are designated for all water bodies in the state. Existing use is implicit. Proceed to the



existing use documentation step in the process for a particular beneficial use (e.g. Cold Water Biota Existing) if it is designated. Once again, there is no need to document the use as existing as it is implicit.

Aquatic Life Beneficial Uses (1310)

Cold Water Biota and Warm Water Biota are beneficial uses that have been adopted to protect and maintain viable communities of aquatic species. Waters of the state exhibiting Salmonid Spawning are waters that support an active, self-propagating community of salmonid fishes.

Aquatic Species Present (1311)

Q: Are aquatic species present or have they been present on or after November 28, 1975?

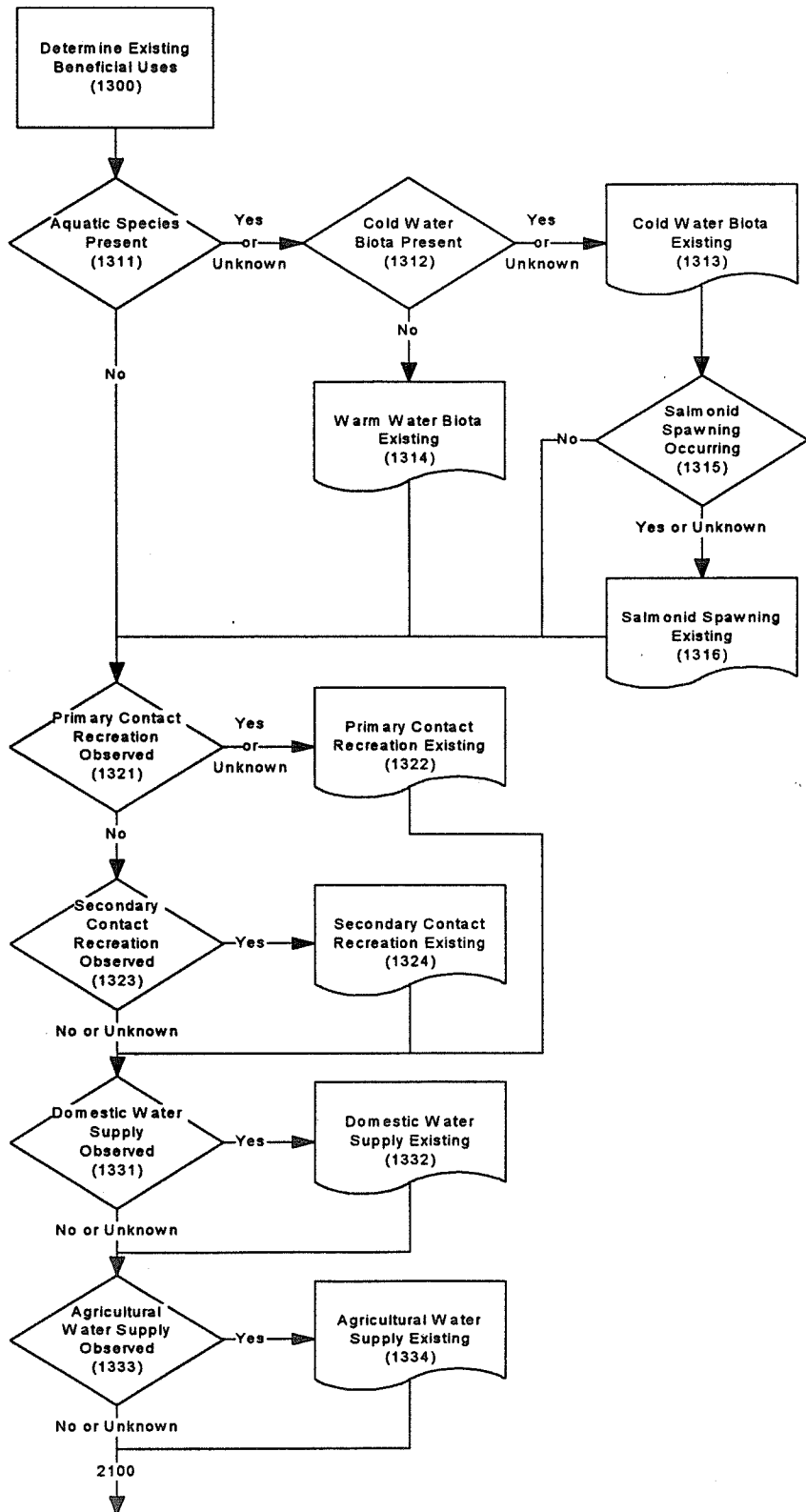
- Yes or unknown; go to decision 1312.
- No; go to decision 1321.

Cold Water Biota Present (1312)

Lists for both macroinvertebrates (Appendix H) and fish (Appendix I), which the DEQ recognizes as cold water species, are in the appendices.

Q: Are cold water species of either macroinvertebrates or fish present or have they been present on or after November 28, 1975?

- Yes or unknown; go to documentation 1313.



- No; go to documentation 1314.

Cold Water Biota Existing (1313)

Document Cold Water Biota as an existing use.

- ☞ Document findings by marking an “X” in both the Cold box for Water Biota and in the cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).

- Go to decision 1315.

Warm Water Biota Existing (1314)

Document Warm Water Biota as an existing use.

- ☞ Document findings by marking an “X” in both the Warm box for Water Biota and in the cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).

- Go to decision 1321.

Salmonid Spawning Occurring (1315)

Salmonid fishes occurring in Idaho include: rainbow trout/steelhead; cutthroat trout; rainbow/cutthroat trout hybrids; brook trout; bull trout; brook/bull trout hybrids; brown trout; brook/brown trout hybrids (tiger trout); lake trout; brook/lake trout hybrids (splake); golden trout; kokanee/sockeye salmon; coho salmon; chinook salmon; lake whitefish; mountain whitefish; Bear Lake whitefish; pygmy whitefish; Bonneville whitefish; Bonneville cisco; Atlantic salmon; and Arctic grayling.

Q: Are non-stocked salmonid fishes present or have they been present on or after November 28, 1975?

- Yes or unknown; go to documentation 1316.
- No; go to decision 1321.

Salmonid Spawning Existing (1316)

Document Salmonid Spawning as an existing use.

- ☞ Document findings by marking an “X” in the Salmonid Spawning cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).

- Go to decision 1321.

Recreation Beneficial Uses (1320)

Waters of the state exhibiting recreation beneficial uses, Primary Contact Recreation and Secondary Contact Recreation, are waters suitable or intended to be made suitable for recreational uses. Primary Contact Recreation uses are to be suitable for prolonged and intimate contact by humans or for recreational activities when the ingestion of small quantities of water is likely to occur. Secondary Contact Recreation uses are suitable for recreational use on or about the water and that are not included in Primary Contact Recreation.

Primary and Secondary contact recreation beneficial uses shall be determined existing by the observation of use.

Primary Contact Recreation Observed (1321)

Observation of Primary Contact Recreation use (*e.g.* swimming, water skiing, skin diving) or knowledge of Primary Contact Recreation use (*e.g.* public swimming area) are examples of Primary Contact Recreation use.

Q: Has the water body been used for Primary Contact Recreation on or after November 28, 1975?

- Yes or unknown; go to documentation 1322.
- No; go to decision 1323.

Primary Contact Recreation Existing (1322)

Document Primary Contact Recreation as an existing use.

- ☞ Document findings by making an “X” in the Primary Contact Recreation cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).
- Go to decision 1331.

Secondary Contact Recreation Observed (1323)

Observation of Secondary Contact Recreation use (*e.g.* fishing, wading, boating) or knowledge of Secondary Contact Recreation use (*e.g.* boat ramps, fishing areas) are examples of Secondary Contact Recreation use.

Q: Has the water body been used for Secondary Contact Recreation on or after November 28, 1975?

- Yes; go to documentation 1324.
- No or unknown; go to decision 1331.

Secondary Contact Recreation Existing (1324)

Document Secondary Contact Recreation as an existing use.

- ☞ Document findings by marking an “X” in the Secondary Contact Recreation cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).
- Go to decision 1331.

Water Supply Beneficial Uses (1330)

There are two categories of water supply beneficial uses that need to be evaluated; Domestic Water Supply and Agricultural Water Supply. Waters of the state exhibiting water supply uses are waters suitable or intended to be made suitable for water supply uses. Domestic and Agricultural water supply beneficial uses shall be determined existing by the observation of use.

Domestic Water Supply Observed (1331)

Observation of Domestic Water Supply use (*e.g.* water system intakes) or knowledge of Domestic Water

Supply use (*e.g.* public water supply, water rights for drinking water) are examples of Domestic Water Supply use.

Q: Has the water body been used for Domestic Water Supply on or after November 28, 1975?

- Yes; go to documentation 1332.
- No or unknown; go to decision 1333.

Domestic Water Supply Existing (1332)

Document Domestic Water Supply as an existing use.

- ☞ Document findings by marking an “X” in the Domestic Water Supply cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).
- Go to decision 1333.

Agricultural Water Supply Observed (1333)

Observation of Agricultural Water Supply use (*e.g.* irrigation withdrawal, grazing) or knowledge of Agricultural Water Supply use (*e.g.* grazing allotment, agricultural water right) are examples of Agricultural Water Supply use.

Q: Has the water body been used for Agricultural Water Supply on or after November 28, 1975?

- Yes; go to documentation 1334.
- No or unknown; go to decision 2100.

Agricultural Water Supply Existing (1334)

Document Agricultural Water Supply as an existing use.

- ☞ Document findings by marking an “X” in the Agricultural Water Supply cell in the Existing Use column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F).
- Go to decision 2100.

Aquatic Life Beneficial Uses Status Determinations (2000)

Need to Assess (2100)

Q: Is Cold Water Biota, Warm Water Biota, or Salmonid Spawning a designated or existing beneficial use?

- Yes; go to decision 2200.
- No; go to decision 3100.

Data Existing (2200)

Q: Do water column chemistry data (pH, dissolved gas, chlorine, toxic substance, dissolved oxygen, temperature, ammonia, turbidity, intergravel dissolved oxygen) exist that are less than or equal to five years old?

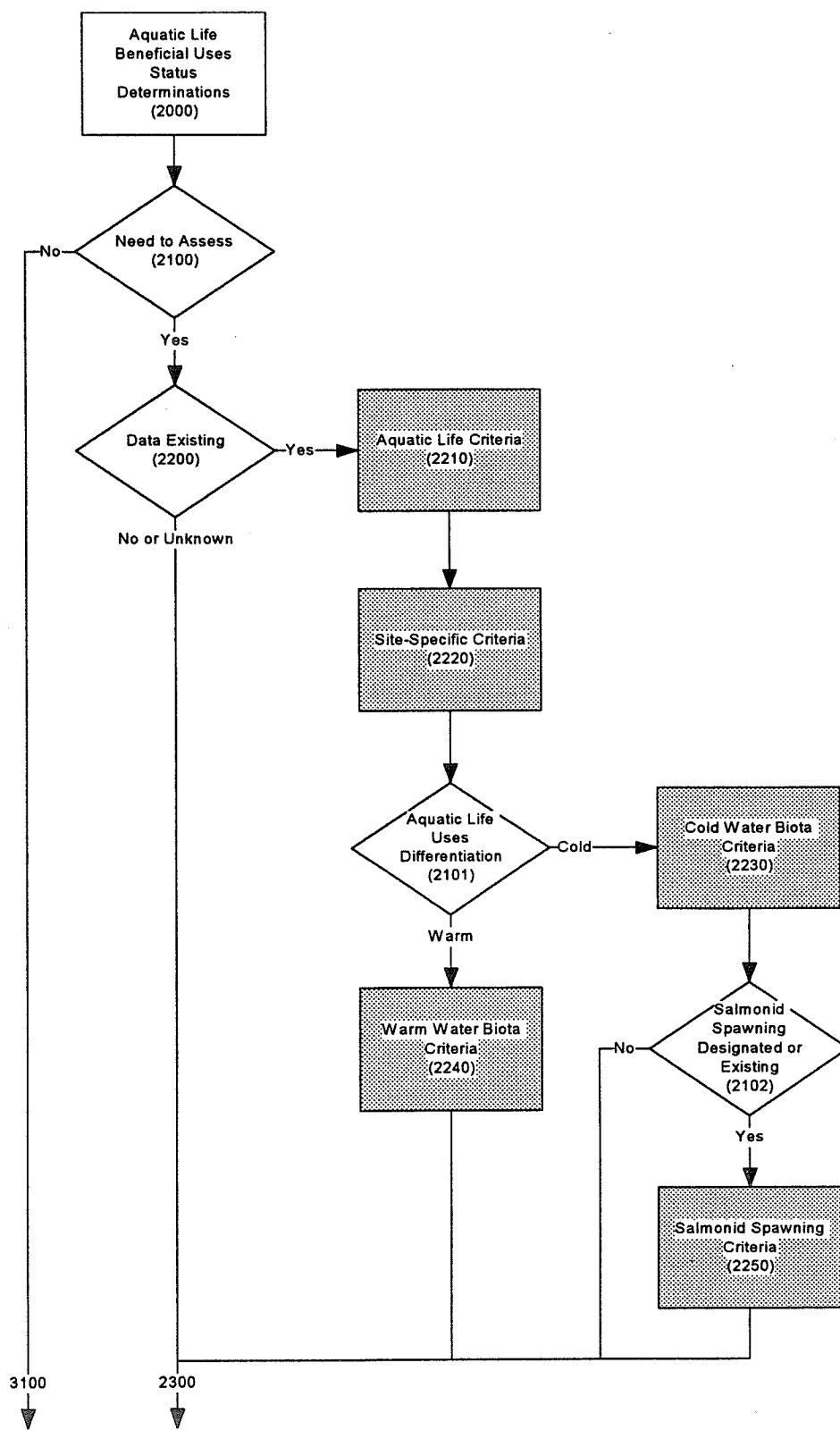
- Yes; go to decision 2211.
- No or unknown; go to decision 2300.

Aquatic Life Criteria (2210)

pH Criterion (2211)

Q: Is the Hydrogen Ion concentration (pH) less than 6.5 or greater than 9.5; *Water Quality Standards and Wastewater Treatment Requirements 250.02.a.i.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2215.
- No or unknown; go to decision 2212.



Dissolved Gas Criterion (2212)

Q: Is the total concentration of dissolved gas greater than one hundred and ten percent (110%) of saturation at atmospheric pressure at the point of sample collection; *Water Quality Standards and Wastewater Treatment Requirements 250.02.a.ii.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2215.
- No or unknown; go to decision 2213.

Chlorine Criteria (2213)

Q: Is the total residual chlorine one-hour average concentration greater than 19.0 µg/L or the four-day average concentration greater than 11.0 µg/L; *Water Quality Standards and Wastewater Treatment Requirements 250.02.a.iii.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2215.
- No or unknown; go to decision 2214.

Toxic Substance Criteria (2214)

Q: Do the one-hour average concentrations of toxic substances exceed any criterion listed under CMC(Acute)-B1 column, the four-day average concentrations of toxic substances exceed any criterion listed under CCC(Chronic)-B2 column, or any toxic substance data exceed the criteria under Human Health-D2 column as found in Aquatic Life Criteria for Toxic Substances (Appendix J)?

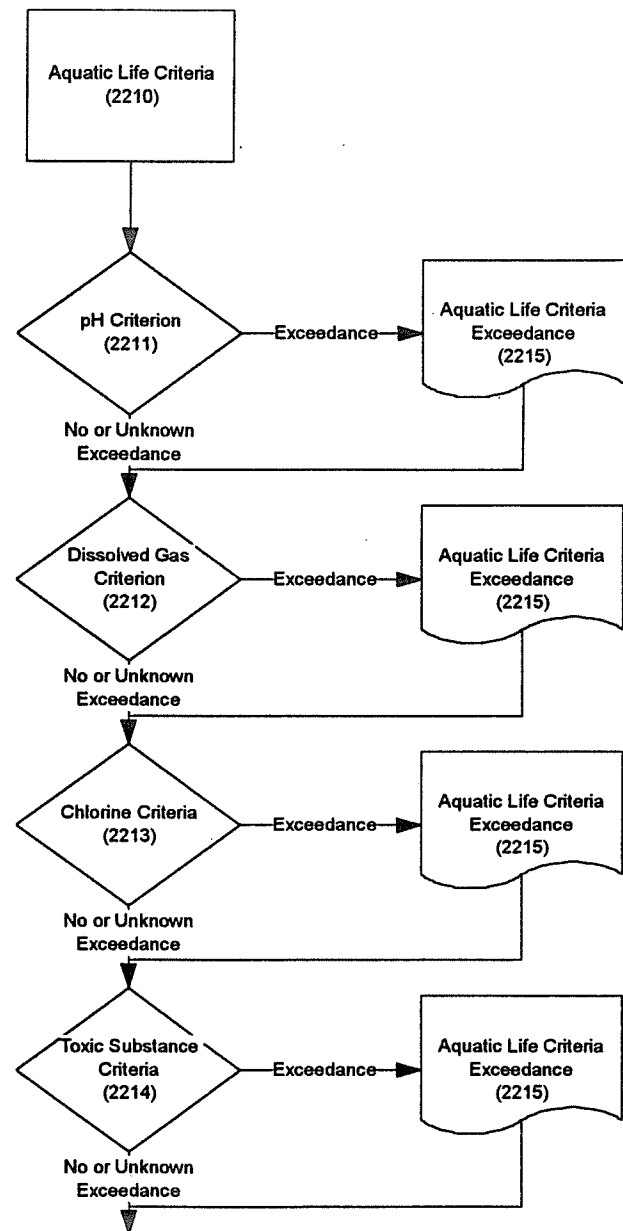
- Yes; go to documentation 2215.
- No or unknown; go to decision 2221.

Aquatic Life Criteria Exceedance (2215)

Document aquatic life criteria have been exceeded.

In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include water column chemistry data and frequency or duration of exceedance if information exists. For example, an aquatic life pH criterion exceedance would be recorded as follows:

Aquatic Life, pH, 250.02.a.i.; pH 4.3 for ten (10) days.



- After documenting an exceedance, proceed to the next aquatic life criterion question; then go to decision 2221.

Site-Specific Criteria (2220)

Read Standards for Exceedances (2221)

Q: Are there any exceedances of the *Water Quality Standards and Wastewater Treatment Requirements, Site-Specific Surface Water Quality Criteria, sections 276. through 298.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2222.
- No or unknown; go to decision 2101.

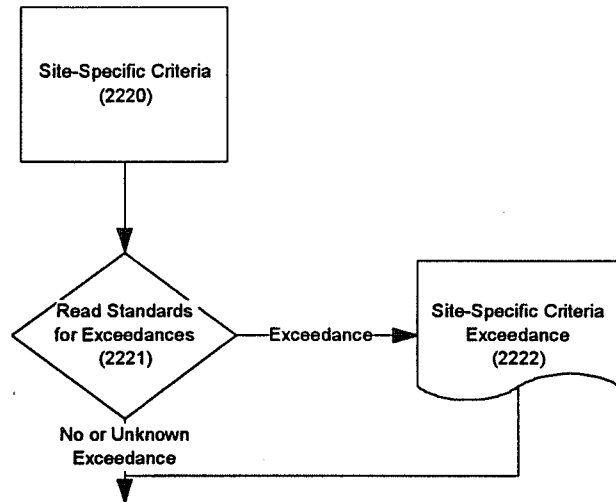
Site-Specific Criteria Exceedance (2222)

Document site-specific criteria have been exceeded.

- ✎ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include water column chemistry data and frequency or duration of exceedance if information exists. For example, a site-specific dissolved oxygen criterion exceedance from the waters of the Boise River would be recorded as follows:

Site-Specific, Dissolved Oxygen, 278.; 5.0 mg/L for two (2) days.

- Go to decision 2101.



Aquatic Life Uses Differentiation (2101)

Q: Is Cold Water Biota a designated or existing beneficial use?

- Yes; go to decision 2231.
- No; go to decision 2241.

Cold Water Biota Criteria (2230)

Dissolved Oxygen Criterion (2231)

Q: Is the dissolved oxygen concentration less than 6.0 mg/L at any time? This standard does not apply to: (1) the bottom twenty percent (20%) of the water depth in natural lakes and reservoirs where depths are thirty-five (35) meters or less; (2) the bottom seven (7) meters of water depth in natural lakes and reservoirs where depths are greater than thirty-five (35) meters; or (3) those waters of the hypolimnion in stratified lakes and reservoirs; *Water Quality Standards and Wastewater Treatment Requirements*

250.02.c.i.(1)-(3). (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2235.
- No or unknown; go to decision 2232.

Temperature Criterion (2232)

Q: Do maximum instantaneous water temperatures exceed twenty-two (22) degrees C with a maximum daily average greater than nineteen (19) degrees C; *Water Quality Standards and Wastewater Treatment Requirements 250.02.c.ii.* (Idaho Department of Health and Welfare n.d.a)?

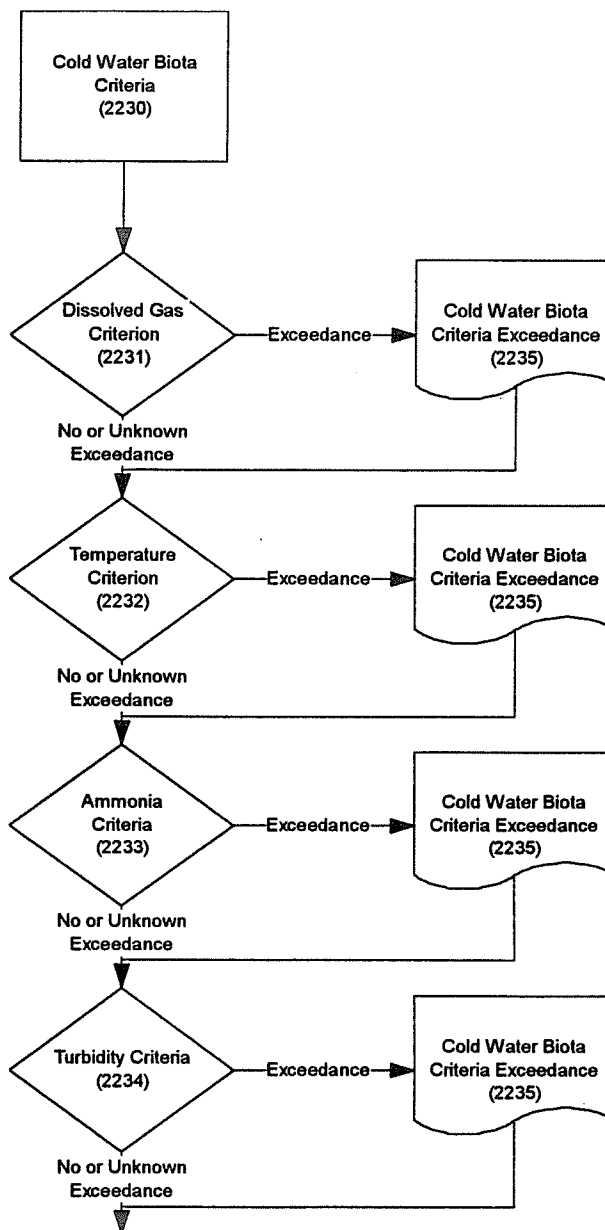
- Yes; go to documentation 2235.
- No or unknown; go to decision 2233.

Ammonia Criteria (2233)

Q: Is the one-hour average concentration of un-ionized ammonia (as N) greater than $(0.43/A/B/2)$ mg/L where:

- A = 1 if the water temperature (T) is greater than or equal to 20 degrees C (if T > 30 degrees C site-specific criteria should be defined), or;
- A = $10^{(0.03(20-T))}$ if T is less than 20 degrees C; and
- B = 1 if the pH is greater than or equal to 8 (if pH > 9.0 site-specific criteria should be defined), or;
- B = $(1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if pH < 6.5 site-specific criteria should be defined)?

One-hour average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table III *Water Quality Standards and Wastewater Treatment Requirements 250.02.c.iii.(1).(a).* (Idaho Department of Health and Welfare n.d.a).



-or-

Q: Is the four-day average concentration of un-ionized ammonia (as N) greater than $(0.66/A/B/C)$ mg/L where:

- A = 1.4 if the water temperature (T) is greater than or equal to 15 degrees C (if T > 30 degrees C

site-specific criteria should be defined), or;

- $A = 10^{(0.03(20-T))}$ if T is less than 15 degrees C, and;
- $B = 1$ if the pH is greater than or equal to 8 (if pH > 9.0 site-specific criteria should be defined), or;
- $B = (1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if pH < 6.5 site-specific criteria should be defined), and;
- $C = 13.5$ if the pH is greater than or equal to 7.7, or;
- $C = 20(10^{(7.7-pH)})/(1+10^{(7.4-pH)})$ if the pH is less than 7.7?

Four-day average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table IV *Water Quality Standards and Wastewater Treatment Requirements*

250.02.c.iii.(2).(a). (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2235.
- No or unknown; go to decision 2234.

Turbidity Criteria (2234)

Q: Is the turbidity, below any applicable mixing zone set by the Department, greater than background turbidity by more than 50 nephelometric turbidity units (NTU) instantaneously or more than 25 NTU for more than ten (10) consecutive days; *Water Quality Standards and Wastewater Treatment Requirements* 250.02.c.iv. (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2235.
- No or unknown; go to decision 2102.

Cold Water Biota Criteria Exceedance (2235)

Document Cold Water Biota criteria have been exceeded.

- ✎ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include water column chemistry data and frequency or duration of exceedance if information exists. For example, a Cold Water Biota turbidity criterion exceedance would be recorded as follows:

Cold Water Biota, Turbidity, 250.02.c.iv.; 150 NTU instantaneously.

- After documenting an exceedance, proceed to the next Cold Water Biota criterion question; then go to decision 2102.

Warm Water Biota Criteria (2240)

Dissolved Oxygen Criterion (2241)

Q: Is the dissolved oxygen concentration less than 5.0 mg/L at any time? This standard does not apply to: (1) the bottom twenty percent (20%) of the water depth in natural lakes and reservoirs where depths are thirty-five (35) meters or less; (2) the bottom seven (7) meters of water depth in natural lakes and reservoirs where depths are greater than thirty-five (35) meters; or (3) those waters of the hypolimnion in stratified lakes and reservoirs; *Water Quality Standards and Wastewater Treatment Requirements* 250.02.b.i.(1)-(3). (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2244.
- No or unknown; go to decision 2242.

Temperature Criterion (2242)

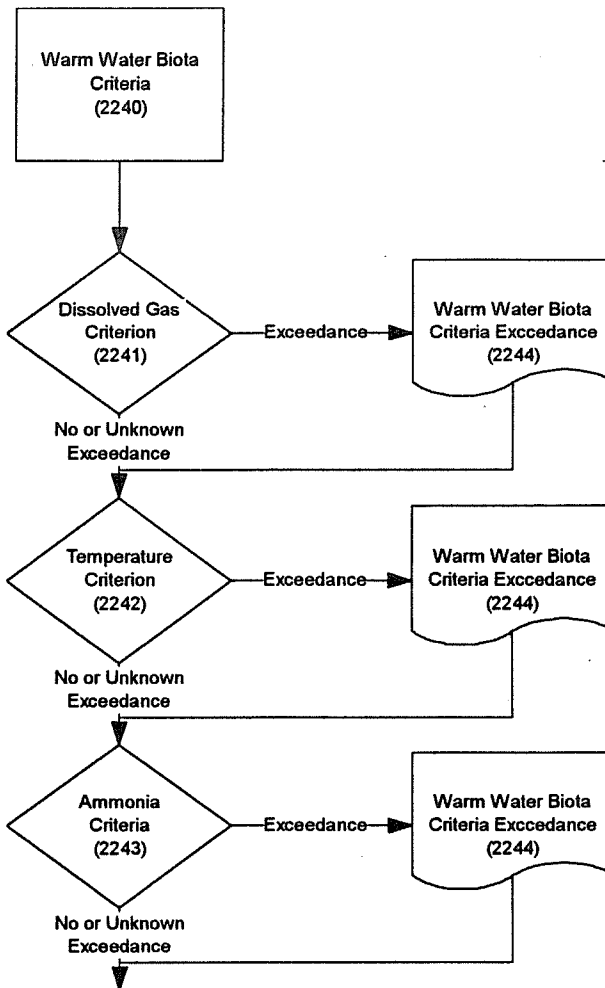
Q: Do maximum instantaneous water temperatures exceed thirty-three (33) degrees C with a maximum daily average greater than twenty-nine (29) degrees C; *Water Quality Standards and Wastewater Treatment Requirements 250.02.b.ii.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 2244.
- No or unknown; go to decision 2243.

Ammonia Criteria (2243)

Q: Is the one-hour average concentration of un-ionized ammonia (as N) greater than $(0.43/A/B/2)$ mg/L where:

- $A = 0.7$ if the water temperature (T) is greater than or equal to 25 degrees C (if $T > 30$ degrees C site-specific criteria should be defined), or;
- $A = 10^{(0.03(20-T))}$ if T is less than 25 degrees C, and;
- $B = 1$ if the pH is greater than or equal to 8 (if $pH > 9.0$ site-specific criteria should be defined), or;
- $B = (1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if $pH < 6.5$ site-specific criteria should be defined)?



One-hour average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table I *Water Quality Standards and Wastewater Treatment Requirements 250.02.b.iii. (a).* (Idaho Department of Health and Welfare n.d.a).

-or-

Q: Is the four-day average concentration of un-ionized ammonia (as N) greater than $(0.66/A/B/C)$ mg/L where:

- $A = 1.0$ if the water temperature (T) is greater than or equal to 20 degrees C (if $T > 30$ degrees C site-specific criteria should be defined), or;
- $A = 10^{(0.03(20-T))}$ if T is less than 20 degrees C, and;
- $B = 1$ if the pH is greater than or equal to 8 (if $pH > 9.0$ site-specific criteria should be defined), or;
- $B = (1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if $pH < 6.5$ site-specific criteria should be defined),

and;

- $C = 13.5$ if the pH is greater than or equal to 7.7, or;
- $C = 20(10^{(7.7-pH)})/(1+10^{(7.4-pH)})$ if the pH is less than 7.7?

Four-day average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table II *Water Quality Standards and Wastewater Treatment Requirements* 250.02.b.iii.(2).(a). (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2244.
- No or unknown; go to decision 2300.

Warm Water Biota Criteria Exceedance (2244)

Document Warm Water Biota criteria have been exceeded.

- ☞ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include water column chemistry data and frequency or duration of exceedance if information exists. For example, a Warm Water Biota temperature criterion exceedance would be recorded as follows:

Warm Water Biota, Temperature, 250.02.b.ii.; 31 degrees C maximum daily average.

- After documenting an exceedance, proceed to the next Warm Water Biota criterion question; then go to decision 2300.

Salmonid Spawning Designated or Existing (2102)

Q: Is Salmonid Spawning a designated or existing beneficial use?

- Yes; go to decision 2251.
- No; go to decision 2300.

Salmonid Spawning Criteria (2250)

Intergravel Dissolved Oxygen Criteria (2251)

Q: During the spawning and incubation period for this water body's particular species, is the one-day minimum intergravel dissolved oxygen concentration less than 5.0 mg/L; *Water Quality Standards and Wastewater Treatment Requirements* 250.02.d.i.(1).(a). (Idaho Department of Health and Welfare n.d.a)?

-or-

Q: During the spawning and incubation period for this water body's particular species, is the seven-day mean intergravel dissolved oxygen concentration less than 6.0 mg/L; *Water Quality Standards and*

Wastewater Treatment Requirements

250.02.d.i.(1).(b). (Idaho Department of Health and Welfare n.d.a)?

Time periods for salmonid spawning and incubation are listed in the *Water Quality Standards and Wastewater Treatment Requirements 250.02.d.iv.* (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2255.
- No or unknown; go to decision 2252.

Water Column Dissolved Oxygen Criteria (2252)

Q: During the spawning and incubation period for this water body's particular species, is the one-day minimum dissolved oxygen concentration less than 6.0 mg/L or ninety percent (90%) of saturation, whichever is greater; *Water Quality Standards and Wastewater Treatment Requirements 250.02.d.i.(2).(a).* (Idaho Department of Health and Welfare n.d.a)?

Time periods for salmonid spawning and incubation are listed in the *Water Quality Standards and Wastewater Treatment Requirements 250.02.d.iv.* (Idaho Department of Health and Welfare n.d.a).

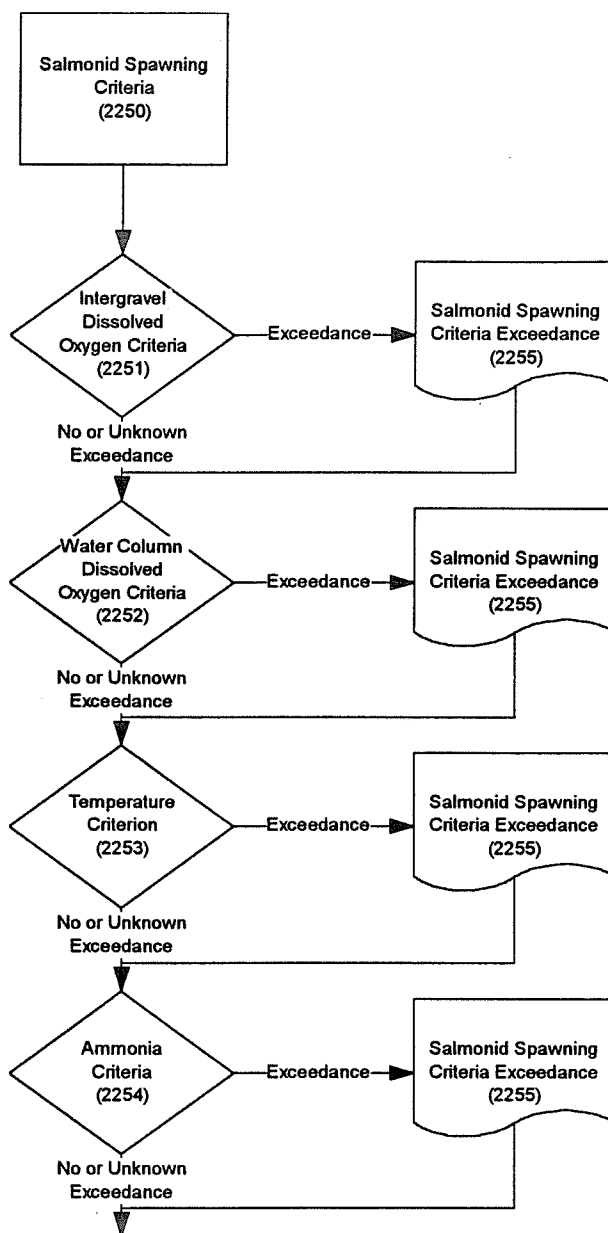
- Yes; go to documentation 2255.
- No or unknown; go to decision 2253.

Temperature Criterion (2253)

Q: During the spawning and incubation period for this water body's particular species, do maximum instantaneous water temperatures exceed thirteen (13) degrees C with a maximum daily average greater than nine (9) degrees C; *Water Quality Standards and Wastewater Treatment Requirements 250.02.d.ii.* (Idaho Department of Health and Welfare n.d.a)?

Time periods for salmonid spawning and incubation are listed in the *Water Quality Standards and Wastewater Treatment Requirements 250.02.d.iv.* (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2255.
- No or unknown; go to decision 2254.



Ammonia Criteria (2254)

Q: During the spawning and incubation period for this water body's particular species, is the one-hour average concentration of un-ionized ammonia (as N) greater than $(0.43/A/B/2)$ mg/L where:

- $A = 1$ if the water temperature (T) is greater than or equal to 20 degrees C (if $T > 30$ degrees C site-specific criteria should be defined), or;
- $A = 10^{(0.03(20-T))}$ if T is less than 20 degrees C, and;
- $B = 1$ if the pH is greater than or equal to 8 (if $pH > 9.0$ site-specific criteria should be defined), or;
- $B = (1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if $pH < 6.5$ site-specific criteria should be defined)?

One-hour average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table III *Water Quality Standards and Wastewater Treatment Requirements* 250.02.c.iii.(1).(a). (Idaho Department of Health and Welfare n.d.a).

-or-

Q: During the spawning and incubation period for the water body's particular species, is the four-day average concentration of un-ionized ammonia (as N) greater than $(0.66/A/B/C)$ mg/L where:

- $A = 1.4$ if the water temperature (T) is greater than or equal to 15 degrees C (if $T > 30$ degrees C site-specific criteria should be defined), or;
- $A = 10^{(0.03(20-T))}$ if T is less than 15 degrees C, and;
- $B = 1$ if the pH is greater than or equal to 8 (if $pH > 9.0$ site-specific criteria should be defined), and;
- $B = (1+10^{(7.4-pH)})/1.25$ if the pH is less than 8 (if $pH < 6.5$ site-specific criteria should be defined), and;
- $C = 13.5$ if the pH is greater than or equal to 7.7, or;
- $C = 20(10^{(7.7-pH)})/(1+10^{(7.4-pH)})$ if the pH is less than 7.7?

Four-day average criteria for un-ionized ammonia (mg/L as N) at various water temperatures and pH values are listed in Table IV *Water Quality Standards and Wastewater Treatment Requirements* 250.02.c.iii.(2).(a). (Idaho Department of Health and Welfare n.d.a).

Time periods for salmonid spawning and incubation are listed in the *Water Quality Standards and Wastewater Treatment Requirements* 250.02.d.iv. (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 2255.
- No or unknown; go to decision 2300.

Salmonid Spawning Criteria Exceedance (2255)

Document Salmonid Spawning criteria have been exceeded.

- ☞ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include water column chemistry data and frequency or duration of exceedance if information exists. For example, a Salmonid Spawning intergravel dissolved oxygen criterion exceedance would be recorded as follows:

Salmonid Spawning, Intergravel Dissolved Oxygen, 250.02.d.i.(1).(b).; 4.5 mg/L for two (2) days.

- After documenting an exceedance, proceed to the next Salmonid Spawning criterion question; then go to decision 2300.

Ecological Indicators (2300)

Q: Do biological (macroinvertebrate, fish, algae) and physical habitat data exist that are less than or equal to five years old?

- Yes; go to decision 2311.
- No or unknown; go to documentation 2411.

Cold Water Biota or Warm Water Biota Bioassessment Process (2310)

The DEQ bioassessment process uses at a minimum reconnaissance level data (e.g. BURP). Initial status determinations are made using macroinvertebrate (Appendix A) and habitat (Appendix B) indices. Other aquatic, biological assemblages (Appendices C-E) should be used when macroinvertebrates are not conclusive. Following is a matrix demonstrating the logic used for Cold Water Biota or Warm Water Biota.

MBI = Not-Impaired and HI = Not-Impaired (2311)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Not-Impaired and the DEQ Habitat Index (HI) = Not-Impaired?

- Yes; go to documentation 2412.
- No or unknown; go to decision 2312.

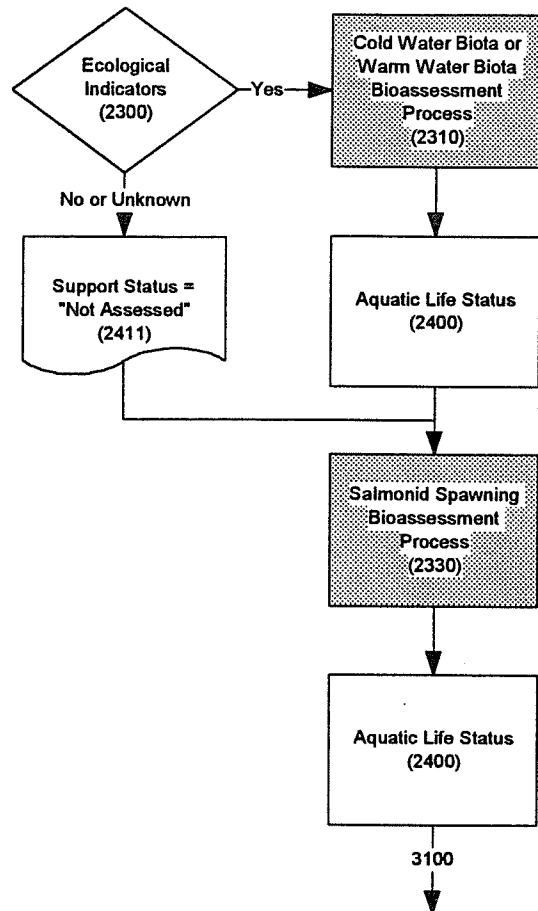
MBI = Impaired and HI = Not-Impaired (2312)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Impaired and the DEQ Habitat Index (HI) = Not-Impaired?

- Yes; go to documentation 2413.
- No or unknown; go to decision 2313.

MBI = Not-Impaired and HI = Impaired (2313)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Not-Impaired and the DEQ Habitat Index (HI) = Impaired?



- Yes; go to documentation 2413.
- No or unknown; go to decision 2314.

	<i>MBI = Not-Impaired</i>	<i>MBI = Impaired</i>	<i>MBI = Needs Verification</i>
<i>HI = Not-Impaired</i>	Cold or Warm Water Biota = "Full Support"	Cold or Warm Water Biota = "Not Full Support"	Look to other assemblages for status
<i>HI = Impaired</i>	Cold or Warm Water Biota = "Not Full Support"	Cold or Warm Water Biota = "Not Full Support"	Cold or Warm Water Biota = "Not Full Support"
<i>HI = Needs Verification</i>	Cold or Warm Water Biota = "Needs Verification"	Cold or Warm Water Biota = "Not Full Support"	Look to other assemblages for status

MBI = Impaired and HI = Impaired (2314)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Impaired and the DEQ Habitat Index (HI) = Impaired?

- Yes; go to documentation 2413.
- No or unknown; go to decision 2315.

MBI = Needs Verification and HI = Impaired (2315)

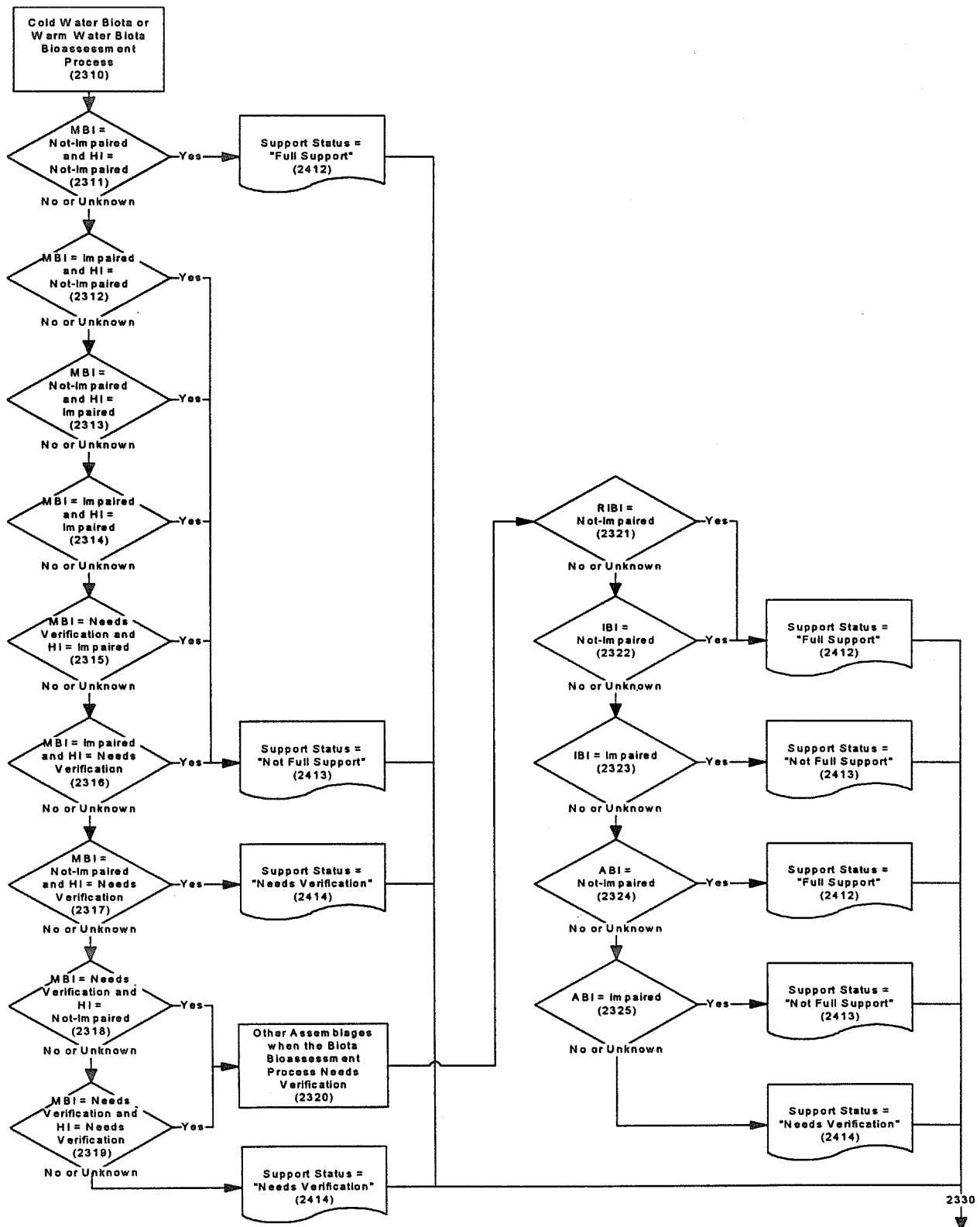
Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Needs Verification and the DEQ Habitat Index (HI) = Impaired?

- Yes; go to documentation 2413.
- No or unknown; go to decision 2316.

MBI = Impaired and HI = Needs Verification (2316)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Impaired and the DEQ Habitat Index (HI) = Needs Verification?

- Yes; go to documentation 2413.
- No or unknown; go to decision 2317.



MBI = Not-Impaired and HI = Needs Verification (2317)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Not-Impaired and the DEQ Habitat Index (HI) = Needs Verification?

- Yes; go to documentation 2414.
- No or unknown; go to decision 2318.

MBI = Needs Verification and HI = Not-Impaired (2318)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Needs Verification and the DEQ Habitat Index (HI) = Not-Impaired?

- Yes; go to decision 2321.
- No or unknown; go to decision 2319.

MBI = Needs Verification and HI = Needs Verification (2319)

Q: Does the DEQ Macroinvertebrate Biotic Index (MBI) = Needs Verification and the DEQ Habitat Index (HI) = Needs Verification?

- Yes; go to decision 2321.
- No or unknown; go to documentation 2414.

Other Assemblages when the Biota Bioassessment Process Needs Verification (2320)

RIBI = Not-Impaired (2321)

Q: Does the DEQ Reconnaissance Index of Biotic Integrity (RIBI) = Not-Impaired?

- Yes; go to documentation 2412.
- No or unknown; go to decision 2322.

IBI = Not-Impaired (2322)

Q: Does the DEQ Index of Biotic Integrity (IBI) = Not-Impaired?

- Yes; go to documentation 2412.
- No or unknown; go to decision 2323.

IBI = Impaired (2323)

Q: Does the DEQ Index of Biotic Integrity (IBI) = Impaired?

- Yes; go to documentation 2413.
- No or unknown; go to decision 2324.

ABI = Not-Impaired (2324)

Q: Does the Algal Biotic Index (ABI) = Not-Impaired ?

- Yes; go to documentation 2412.
- No or unknown; go to decision 2325.

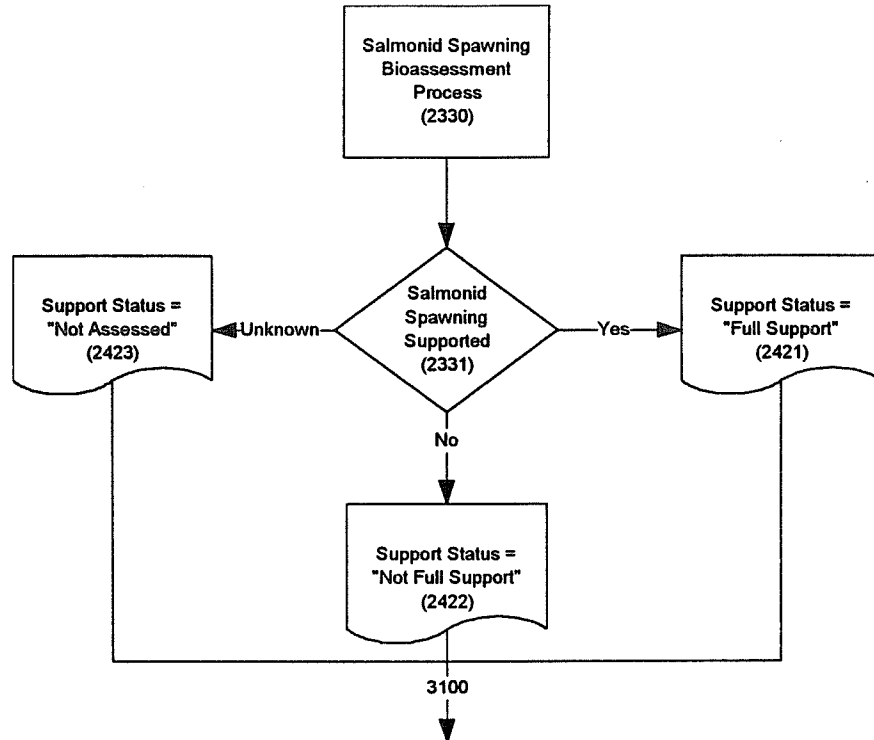
ABI = Impaired (2325)

Q: Does the Algal Biotic Index (ABI) = Impaired ?

- Yes; go to documentation 2413.
- No or unknown; go to documentation 2414.

Salmonid Spawning Bioassessment Process (2330)

Salmonid fishes occurring in Idaho include: rainbow trout/steelhead; cutthroat trout; rainbow/cutthroat trout hybrids; brook trout; bull trout; brook/bull trout hybrids; brown trout; brook/brown trout hybrids (tiger trout); lake trout; brook/lake trout hybrids (splake); golden trout; kokanee/sockeye salmon; coho salmon; chinook salmon; lake whitefish; mountain whitefish; Bear Lake whitefish; pygmy whitefish; Bonneville whitefish; Bonneville cisco; Atlantic salmon; and Arctic grayling.



Salmonid Spawning Supported (2331)

Q: Do data indicate the water body supports an active, self-propagating community of salmonid fishes? This is demonstrated, using best professional judgement, through a length frequency distribution indicating three age classes including young-of-the-year.

- **Example:** A length frequency distribution should be prepared for each salmonid species collected from the water body by counting the number of individuals within each length category. Each category is to account for a ten (10) millimeter range of length (e.g. 0-10 mm, 10-20 mm). Once categorized, the data should be graphically represented as a histogram and a copy of the length frequency histogram attached to the DEQ Water Body Assessment Form (Appendix F).
- Yes; go to documentation 2421.
 - No; go to documentation 2422.
 - Unknown; go to documentation 2423.

Aquatic Life Status (2400)

Cold Water Biota or Warm Water Biota (2410)

Support Status = "Not Assessed" (2411)

Document Cold Water Biota or Warm Water Biota as "Not Assessed."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NA" on the Cold or Warm Water Biota line to indicate "Not Assessed."

→ Go to decision 2331.

Support Status = "Full Support" (2412)

Document Cold Water Biota or Warm Water Biota as "Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "FS" on the Cold or Warm Water Biota line to indicate "Full Support."
Document further aquatic life assessments using other biological assemblages in the Assessments Caveats section of the DEQ Water Body Assessment Form (Appendix F). For example, quantitative fish data from Lolo Creek indicating Not-Impaired waters would be recorded as follows:

Cold Water Biota, IBI (Fisher 1989); "FS."

→ Go to decision 2331.

Support Status = "Not Full Support" (2413)

Document Cold Water Biota or Warm Water Biota as "Not Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NFS" on the Cold or Warm Water Biota line to indicate "Not Full Support."
Document further aquatic life assessments using other biological assemblages in the Assessments Caveats section of the DEQ Water Body Assessment Form (Appendix F). For example, algal data from Crane Creek indicating Impaired waters would be recorded as follows:

Cold Water Biota, ABI; "NFS."

→ Go to decision 2331.

Support Status = "Needs Verification" (2414)

Document Cold Water Biota or Warm Water Biota as "Needs Verification."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NV" on the Cold or Warm Water Biota line to indicate "Needs Verification."

→ Go to decision 2331.

Salmonid Spawning (2420)

Support Status = "Full Support" (2421)

Document Salmonid Spawning as "Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "FS" on the Salmonid Spawning line to indicate "Full Support." In the Assessment Caveats section of the DEQ Water Body Assessment Form (Appendix F), write "Salmonid Spawning status based on qualitative data; quantitative information recommended."
- Go to decision 3100.

Support Status = "Not Full Support" (2422)

Document Salmonid Spawning as "Not Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NFS" on the Salmonid Spawning line to indicate "Not Full Support." In the Assessment Caveats section of the DEQ Water Body Assessment Form (Appendix F), write "Salmonid Spawning status based on qualitative data; quantitative information recommended."
- Go to decision 3100.

Support Status = "Not Assessed" (2423)

Document Salmonid Spawning as "Not Assessed."

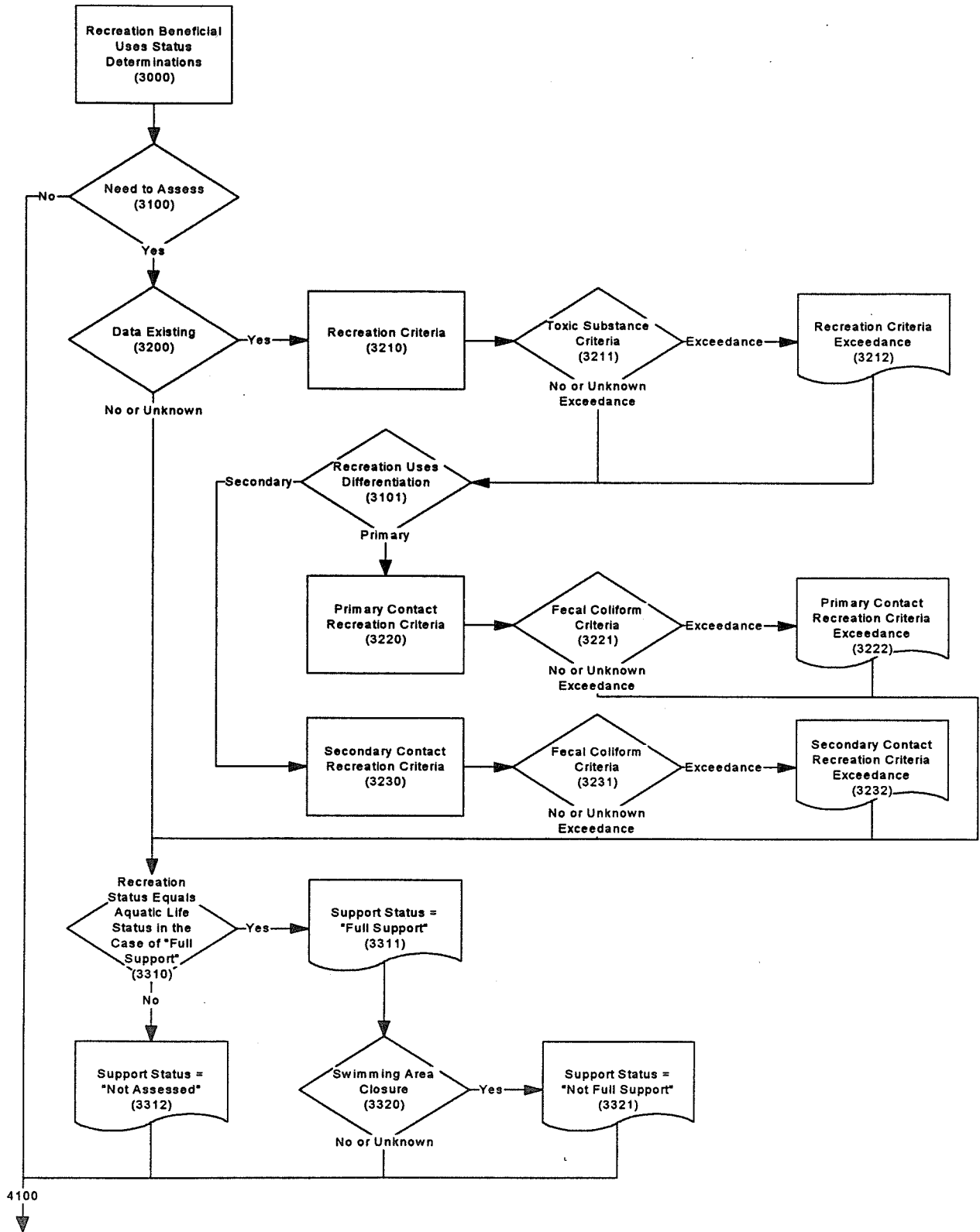
- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NA" on the Salmonid Spawning line to indicate "Not Assessed."
- Go to decision 3100.

Recreation Beneficial Uses Status Determinations (3000)

Need to Assess (3100)

Q: Is Primary Contact Recreation or Secondary Contact Recreation a designated or existing beneficial use?

- Yes; go to decision 3200.
- No; go to decision 4100.



Data Existing (3200)

Q: Do toxic substance or fecal coliform data exist that are less than or equal to five years old?

- Yes; go to decision 3211.
- No or unknown; go to decision 3310.

Recreation Criteria (3210)

Toxic Substance Criteria (3211)

Q: Does the water body exceed any toxic substance criteria in Recreation Criteria for Toxic Substances (Appendix K)?

- Yes; go to documentation 3212.
- No or unknown; go to decision 3101.

Recreation Criteria Exceedance (3212)

Document recreation criteria have been exceeded.

- ✎ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any data and frequency or duration of exceedance if information exists. For example, a recreation cyanide criterion exceedance would be recorded as follows:

Recreation, Cyanide, 250.01.c.; 300,000 mg/L.

- Go to decision 3101.

Recreation Uses Differentiation (3101)

Q: Is Primary Contact Recreation a designated or existing beneficial use?

- Yes; go to decision 3221.
- No; go to decision 3231.

Primary Contact Recreation Criteria (3220)

Fecal Coliform Criteria (3221)

These criteria are applicable between May 1 and September 31 of each calendar year.

Q: Does the fecal coliform count exceed 500/100 ml at any time?

-or-

Q: Does the fecal coliform count exceed 200/100 ml in more than ten percent (10%) of the total samples taken over a thirty (30) day period?

-or-

Q: Does the fecal coliform count exceed a geometric mean of 50/100 ml based on a minimum of five (5) samples taken over a thirty (30) day period; *Water Quality Standards and Wastewater Treatment Requirements 250.01.a.i.-iii.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 3222.
- No or unknown; go to decision 3310.

Primary Contact Recreation Criteria Exceedance (3222)

Document Primary Contact Recreation criteria have been exceeded.

- ✎ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any data and frequency or duration if information exists. For example, a Primary Contact Recreation fecal coliform criterion exceedance would be recorded as follows:

Primary Contact Recreation, Fecal Coliform, 250.01.a.i.; 630/100 ml instantaneously.

- Go to decision 3310.

Secondary Contact Recreation Criteria (3230)

Fecal Coliform Criteria (3231)

Q: Does the fecal coliform count exceed 800/100 ml at any time?

-or-

Q: Does the fecal coliform count exceed 400/100 ml in more than ten percent (10%) of the total samples taken over a thirty (30) day period?

-or-

Q: Does the fecal coliform count exceed a geometric mean of 200/100 ml based on a minimum of five (5) samples taken over a thirty (30) day period; *Water Quality Standards and Wastewater Treatment Requirements 250.01.b.i.-iii.* (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 3232.
- No or unknown; go to decision 3310.

Secondary Contact Recreation Criteria Exceedance (3232)

Document Secondary Contact Recreation criteria have been exceeded.

- ✎ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any data and frequency or duration if information exists. For example, a Secondary Contact Recreation fecal coliform criterion exceedance would be recorded as follows:

Secondary Contact Recreation, Fecal Coliform, 250.01.b.i.; 470/100 ml in 15% of the samples.

- Go to decision 3310.

Recreation Status (3300)

Recreation Status Equals Aquatic Life Status in the Case of "Full Support" (3310)

Q: Does aquatic life status equal "Full Support?"

- Yes; go to documentation 3311.
- No; go to documentation 3312.

Support Status = "Full Support" (3311)

Document recreation as "Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "FS" on either the Primary Contact Recreation or Secondary Contact Recreation line(s), depending on which is the designated or existing use, to indicate "Full Support."
- Go to decision 3320.

Support Status = "Not Assessed" (3312)

Document recreation as "Not Assessed."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the "NA" on either the Primary Contact Recreation or Secondary Contact Recreation line(s), depending on which is the designated or existing use, to indicate "Not Assessed."
- Go to decision 4100.

Swimming Area Closures (3320)

Q: Has any portion of the water body had two (2) or more beach or swimming closures during the last five years?

- Yes; go to documentation 3321.
- No or unknown; go to decision 4100.

Support Status = "Not Full Support" (3321)

Document Primary Contact Recreation as "Not Full Support."

- ✎ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle “NFS” on the Primary Contact Recreation line to indicate “Not Full Support.” In the Assessment Caveats section, write “Primary Contact Recreation status has been modified due to swimming area closures.”
- Go to decision 4100.

Water Supply Beneficial Uses Status Determinations (4000)

Need to Assess (4100)

- Q: Is Domestic Water Supply, Agricultural Water Supply, or Industrial Water Supply a designated or existing beneficial use?
- Yes; go to decision 4101.
 - No; go to decision 5100.

Water Supply Uses Differentiation (4101)

- Q: Is Domestic Water Supply a designated or existing beneficial use?
- Yes; go to decision 4200.
 - No; go to process 4220.

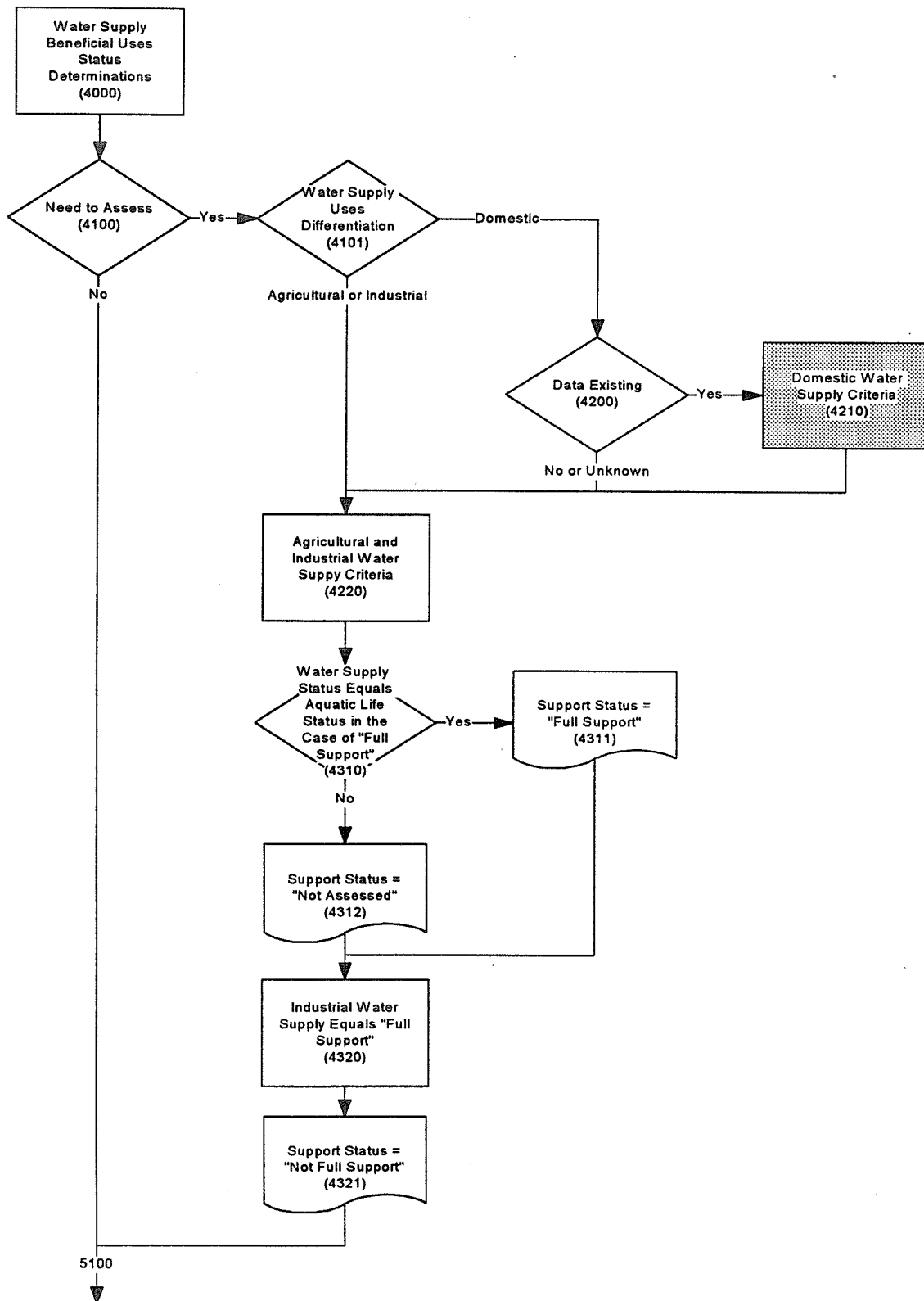
Data Existing (4200)

- Q: Do toxic substance, radioactivity, or turbidity data exist that are less than or equal to five years old?
- Yes; go to decision 4211.
 - No or unknown; go to process 4220.

Domestic Water Supply Criteria (4210)

Toxic Substance Criteria (4211)

- Q: Does the water body exceed any toxic substance criteria in Domestic Water Supply Criteria for Toxic Substances (Appendix L)?
- Yes; go to documentation 4214.
 - No or unknown; go to decision 4212.



Radioactive Criteria (4212)

Q: Does the water body exceed radioactive materials or radioactivity concentrations in drinking water rules; *Rules Governing Public Drinking Water Systems* (Idaho Department of Health and Welfare n.d.b)?

- Yes; go to documentation 4214.
- No or unknown; go to decision 4213.

Turbidity Criteria (4213)

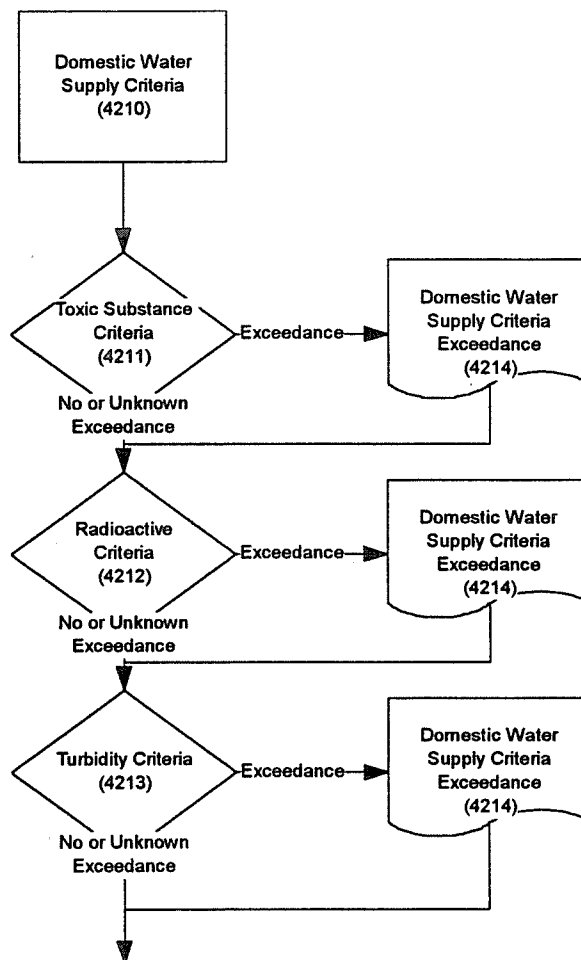
Turbidity criteria are applicable to those water bodies designated as small public water supplies; *Water Quality Standards and Wastewater Treatment Requirements 250.03.a.iii.(1)*. (Idaho Department of Health and Welfare n.d.a).

Q: Has turbidity increased by more than five (5) NTU above natural background when background turbidity is less than fifty (50) NTU?

-or-

Q: Has turbidity increased by more than ten percent (10%) above natural background, not to exceed twenty-five (25) NTU, when background turbidity is greater than fifty (50) NTU?

- Yes; go to documentation 4214.
- No or unknown; go to process 4220.



Domestic Water Supply Criteria Exceedances (4214)

Document Domestic Water Supply criteria have been exceeded.

In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any data and frequency or duration of exceedance if information exists. For example, a Domestic Water Supply radioactivity criterion exceedance would be recorded as follows:

Domestic Water Supply, Radioactivity, 250.03.a.ii.

- After documenting an exceedance, proceed to the next Domestic Water Supply criterion question; then go to process 4220.

Agricultural and Industrial Water Supply Criteria (4220)

Water quality criteria for agricultural and industrial water supplies will generally be satisfied by the *Water Quality Standards and Wastewater Treatment Requirements* narrative criteria (see process 6000).

- ☞ In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any data and frequency or duration of exceedance if information exists. For example, an Agricultural Water Supply excess nutrients criterion exceedance would be recorded as follows:

Agricultural Water Supply, Excess Nutrients, 200.06.; toxic algae.

- After documenting an exceedance; go to decision 4310.

Water Supply Status (4300)

Water Supply Status Equals Aquatic Life Status in the Case of “Full Support” (4310)

Q: Does aquatic life status equal “Full Support?”

- Yes; go to documentation 4311.
- No; go to documentation 4312.

Support Status = “Full Support” (4311)

Document Domestic Water Supply and Agricultural Water Supply as “Full Support.”

- ☞ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the “FS” on either the Domestic Water Supply or Agricultural Water Supply line(s), depending on which is the designated or existing use, to indicate “Full Support.”
- Go to documentation 4321.

Support Status = “Not Assessed” (4312)

Document Domestic Water Supply and Agricultural Water Supply as “Not Assessed.”

- ☞ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the “NA” on either the Domestic Water Supply or Agricultural Water Supply line(s), depending on which is the designated or existing use, to indicate “Not Assessed.”
- Go to documentation 4321.

Industrial Water Supply Status Equals “Full Support” (4320)

Support Status = “Full Support” (4321)

Document Industrial Water Supply as “Full Support.”

- ☞ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the “FS” on the Industrial Water Supply line to indicate “Full Support.”
- Go to decision 5100.

Wildlife Habitat and Aesthetics Beneficial Uses Status Determinations (5000)

Need to Assess (5100)

Q: Is Wildlife Habitat or Aesthetics a designated or existing beneficial use?

- Yes; go to documentation 5311.
- No; go to decision 6100.

Data Existing (5200)

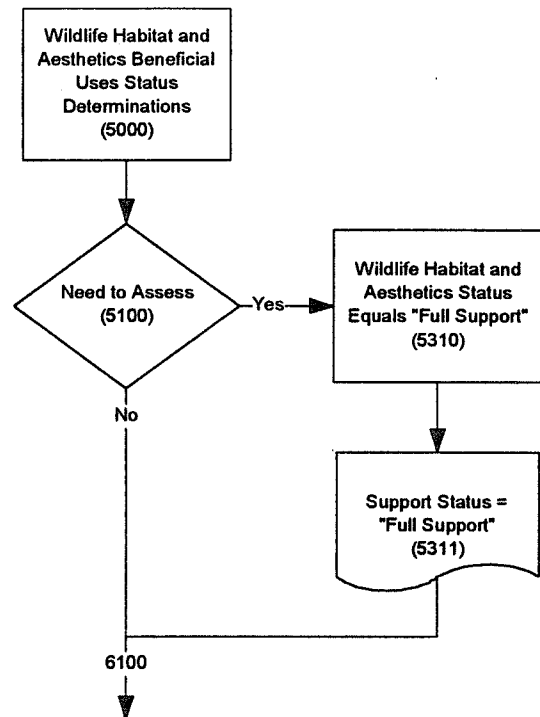
(RESERVED)

Wildlife Habitat Criteria (5210)

(RESERVED)

Aesthetics Criteria (5220)

(RESERVED)



Wildlife Habitat and Aesthetics Status (5300)

Wildlife Habitat and Aesthetics Status Equals "Full Support" (5310)

Support Status = "Full Support" (5311)

Document Wildlife Habitat and Aesthetics as "Full Support."

☞ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle "FS" on the Wildlife Habitat and Aesthetics line(s) to indicate "Full Support."

- Go to decision 6100.

Idaho Water Quality Standards and Wastewater Treatment Requirements Narrative Criteria (6000)

Water Body Impairment (6100)

This section should be used in those instances when beneficial uses are impaired by a pollutant for which there are no numeric criteria (e.g. sediment, nutrients, or perhaps an unlisted hazardous substance). In the absence of specific criteria, a narrative criterion exceedance is based on substantiated best professional judgement. For example, Cascade Reservoir, in recent years, has had several fish kills and cattle were killed from drinking toxic algae in the reservoir water. Even if no criteria existed on toxins, nutrients, et cetera, there was clearly a problem with the water body.

Although it is preferable to make water quality decisions based on numeric criteria, sometimes narrative criteria can be used to assist in making beneficial use status determinations. It will be the responsibility of the DEQ Regional Administrator or their appointee to determine, based on best professional judgement, whether narrative criteria exceedances have impaired a water body. This option should be carefully evaluated and used when the public recognizes there is a problem (e.g. Cascade Reservoir, Mid-Snake River). It is recommended appropriate data be collected to substantiate best professional judgement.

Q: Are any designated or existing beneficial uses impaired, based on best professional judgement, by a pollutant for which there are no numeric criteria?

- Yes; go to decision 6200.
- No or unknown; go to decision 7100.

Availability of Information to Substantiate Judgement (6200)

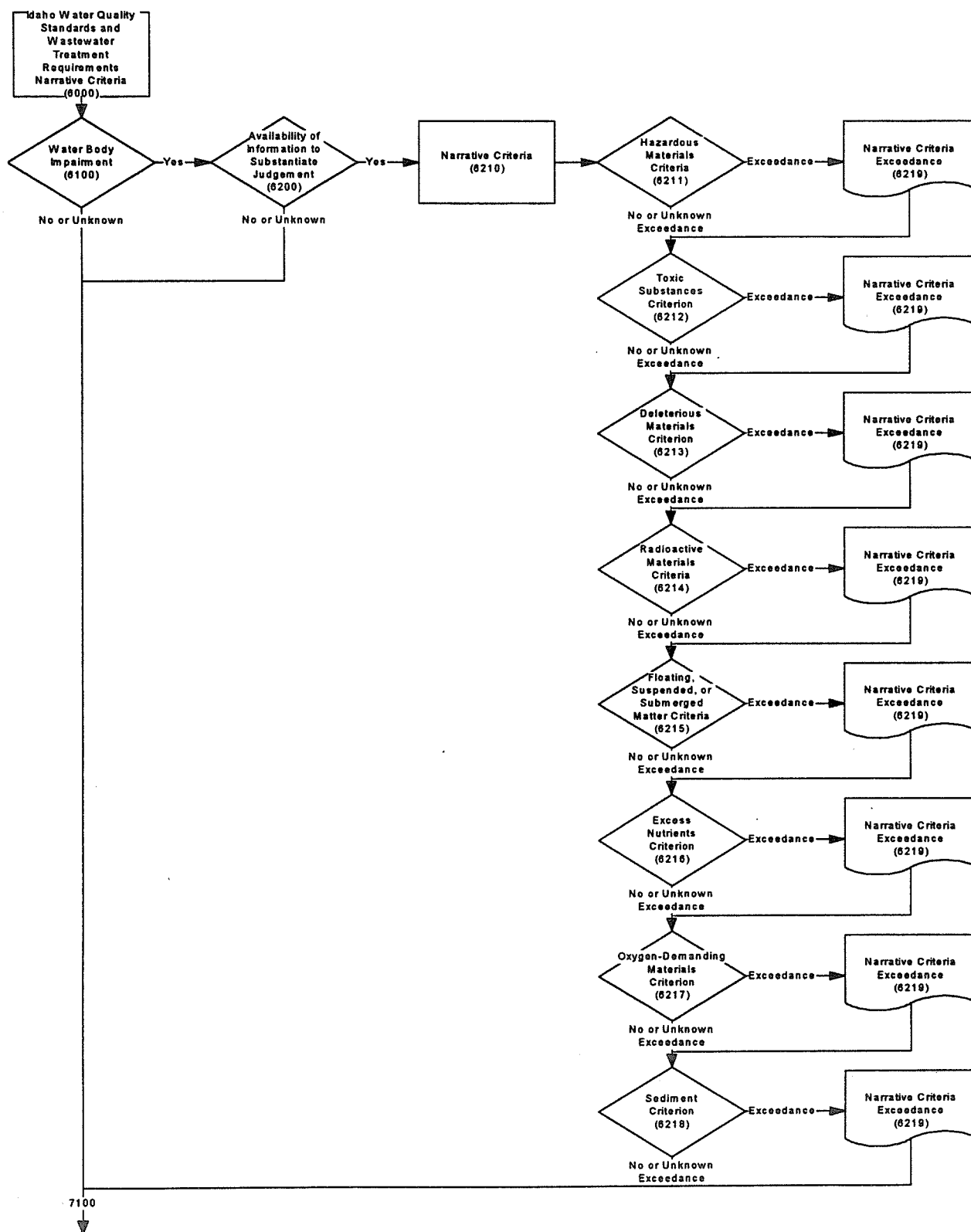
Q: Does information exist that is less than or equal to five years old to substantiate best professional judgement that designated or existing beneficial uses are impaired?

- Yes; go to decision 6211.
- No or unknown; go to decision 7100.

Narrative Criteria (6210)

Hazardous Materials Criteria (6211)

Q: Is the water body free from hazardous materials in concentrations found to be of public health significance or to impair designated beneficial uses? These materials do not include suspended sediment produced as a result of nonpoint source activities; *Water Quality Standards and Wastewater Treatment Requirements 200.01*. (Idaho Department of Health and Welfare n.d.a).



- Yes; go to documentation 6219.
- No or unknown; go to decision 6212.

Toxic Substances Criterion (6212)

Q: Is the water body free from toxic substances in concentrations that impair designated beneficial uses? These substances do not include suspended sediment produced as a result of nonpoint source activities; *Water Quality Standards and Wastewater Treatment Requirements 200.02*. (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 6219.
- No or unknown; go to decision 6213.

Deleterious Materials Criterion (6213)

Q: Is the water body free from deleterious materials in concentrations that impair designated beneficial uses? These materials do not include suspended sediment produced as a result of nonpoint source activities; *Water Quality Standards and Wastewater Treatment Requirements 200.03*. (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 6219.
- No or unknown; go to decision 6214.

Radioactive Materials Criteria (6214)

Q: Do radioactive materials or radioactivity exceed the values listed in the Code of Federal Regulations Title 10, Chapter 1, Part 20, Appendix B, Table 2, Effluent Concentrations, Column 2; *Water Quality Standards and wastewater Treatment Requirements 200.04.a*. (Idaho Department of Health and Welfare n.d.a)?

-or-

Q: Do radioactive materials or radioactivity exceed the concentrations required to meet the standards set forth in the Code of Federal Regulations Title 10, Chapter 1, Part 20, for maximum exposure of critical human organs in the case of foodstuffs harvested from these waters for human consumption; *Water Quality Standards and wastewater Treatment Requirements 200.04.b*. (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 6219.
- No or unknown; go to decision 6215.

Floating, Suspended, or Submerged Matter Criteria (6215)

Q: Is the water body free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses? This matter does not include suspended sediment produced as a result of nonpoint activities; *Water Quality Standards and wastewater Treatment Requirements 200.05*. (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 6219.
- No or unknown; go to decision 6216.

Excess Nutrients Criterion (6216)

Q: Is the water body free from excess nutrients that cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses; *Water Quality Standards and wastewater Treatment Requirements 200.06*. (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to documentation 6219.
- No or unknown; go to decision 6217.

Oxygen-Demanding Materials Criterion (6217)

Q: Is the water body free from oxygen-demanding materials in concentrations that would result in an anaerobic condition; *Water Quality Standards and wastewater Treatment Requirements 200.07*. (Idaho Department of Health and Welfare n.d.a)?


- Yes; go to documentation 6219.
- No or unknown; go to decision 6218.

Sediment Criterion (6218)

Q: Is the water body free from excess sediment in quantities that impair designated beneficial uses; *Water Quality Standards and Wastewater Treatment Requirements 200.08*. (Idaho Department of Health and Welfare n.d.a)? Excess turbidity, below any applicable mixing zone set by the Department, shall not exceed background turbidity by more than fifty (50) NTU instantaneously or more than twenty-five (25) NTU for more than ten (10) consecutive days; *Water Quality Standards and Wastewater Treatment Requirements 250.02.c.iv*. (Idaho Department of Health and Welfare n.d.a).

- Yes; go to documentation 6219.
- No or unknown; go to decision 7100.

Narrative Criteria Exceedance (6219)

 In the Criteria Exceedances section of the DEQ Water Body Assessment Form (Appendix F), record the beneficial use, criterion, and reference. Also include any information and frequency or duration of exceedance if information exists to substantiate best professional judgement. For example, an excess nutrient criterion exceedance resulting in nuisance algal growths would be recorded as follows:

Aesthetics, Excess Nutrients, 200.06.; 150 mg chlorophyll *a*/100 m².

- After documenting an exceedance, proceed to the next narrative criterion question; then go to decision 7100.

Criterion Evaluation Process (7000)

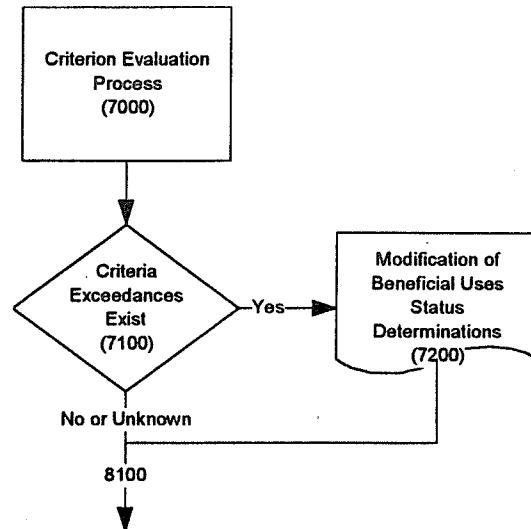
Criteria Exceedances Exist (7100)

Q: Are there criteria exceedances from the water body?

- Yes; go to process 7200.
- No or Unknown; go to decision 8100.

Modification of Beneficial Uses Status Determinations (7200)

Not all criteria exceedances will result in a water body identified as impaired or not fully supporting its beneficial uses. Some criteria are exceeded under natural conditions or are exceeded temporarily and do not result in a negative affect to the beneficial uses. There may be several reasons for these phenomena. It is possible continuous exposure to a naturally occurring pollutant has resulted in an adaptation to the higher pollutant levels, in which case site-specific criteria may need to be developed. In other cases, the state wide criteria are insufficient to explain the complexity of the physical or chemical diversity throughout the state (e.g. aquatic life temperature criterion do not adequately take into account the higher temperature regimes of main stem large rivers). The state wide criteria may need to be modified.



Analysis of criteria exceedances will be judged on a weight-of-evidence approach until a better method is defined. The DEQ Regional Administrator or their appointee will determine whether sufficient criteria exceedances exist to conclude a water body is not fully supporting its beneficial uses. In doing so, the Regional Administrator or their appointee will take into account the frequency or duration of exceedances and the type of criterion exceeded and its relation to the beneficial use. Others should be conferred to assure conclusions are applied consistently. The extent of deviation from the criteria shall be classed as either minor or major. Precision to differentiate between minor and major will be developed with the assistance of the Water Body Assessment Guidance Technical Review Committee. The following table may guide the DEQ Regional Administrator's or their appointee's decision-making process to determine the effect of criterion exceedances on the beneficial use.

- ☞ In the Support Status column of the Beneficial Uses section of the DEQ Water Body Assessment Form (Appendix F), circle the appropriate status to indicate changes made due to criteria exceedances. In the Assessment Caveats section write "(Identify beneficial use) status has been modified due to criteria exceedances."

- Go to decision 8100.

Beneficial Use Status	Extent of Criteria Exceedances (minor vs. major)	Modified Beneficial Use Status Determination
"Full Support"	minor	status = "Full Support" and develop site-specific or modify state wide criteria.
"Full Support"	major	status = "Not Full Support"
"Not Full Support"	minor or major	status = "Not Full Support"
"Needs Verification"	minor	status = "Needs Verification"
"Needs Verification"	major	status = "Not Full Support"
"Not Assessed"	minor	status = "Not Assessed"
"Not Assessed"	major	status = "Not Full Support"

The DEQ Regional Administrator should request the DEQ Director begin appropriate actions if site-specific criteria or a modification of state wide criteria needs to be considered. These actions may include initiation of studies necessary to complete site-specific criteria consistent with the *Water Quality Standards and Wastewater Treatment Requirements 275* (Idaho Department of Health and Welfare n.d.a) or development of new state wide criteria during subsequent triennial reviews of the *Water Quality Standards and Wastewater Treatment Requirements*.

Beneficial Use Attainability (8000)

The EPA identifies three concepts regarding beneficial use protection; designated uses, existing uses, and attainable uses. Designated uses are those beneficial uses the state chooses to protect for a given water body. While the state has some discretion in choosing designated uses, there are some requirements. The CWA indicates states shall designate uses that include fishable and swimmable goals and should take into account propagation of fish, shellfish and wildlife, recreation in and on the water, and water supply uses. States are required to do an intensive study (use attainability analysis) to justify fishable and swimmable goals can not be met if a water body is designated for uses that do not meet the CWA goals (*i.e.* do not contain at least one aquatic life use and one recreation use). The use attainability analysis is also required when a state removes a previously designated use. This mechanism can be simple or complex depending on whether or not the water body remains protected for fishable and swimmable goals after a beneficial use is removed.

The EPA has also indicated existing uses must be protected. An existing use is defined as those uses presently existing in the water body, or those that were existing in the water body on or after November 28,

1975, although they may not be existing now. Existing uses should be considered for designation since an existing use must be protected.

The EPA has also created a third concept, which is often more difficult to understand. The EPA defines attainable uses as those uses that would be expected to be present in a water body if all point sources were controlled by technology-based limits and all nonpoint sources had appropriate best management practices in place to control pollution. Attainability decisions are often based on best professional judgement. Attainable uses for a water body should be considered for designation. Even though, it is better to make candidate designated use determinations based on data (*i.e.* existing uses), there may be instances when attainable uses will be identified. States may demonstrate that attaining a use is not reasonably justified based on physical features or socio-economic situations, and may choose not to designate the attainable use. An example of this justification is when rivers are impounded and the use is attainable only if the impoundment were removed. It may not be reasonable or economically justified to remove the impoundment.

Idaho has many unclassified waters that are protected with a default designation of Primary Contact Recreation. That means these waters are protected for swimmable goals but not fishable. These water bodies need to receive appropriate designations accurately reflecting their existing and attainable uses. In addition, designated water bodies may not reflect appropriate designations and may need to be re-designated. *Protocols for Conducting Use Attainability Analyses for Determining Beneficial Uses to be Designated on Idaho Stream Segments* (Maret and Jensen 1991) can be used as a guide for determining appropriate attainable beneficial uses. However, this guidance has modified some aspects of the protocol. Water temperatures supportive of aquatic life reflect the *Water Quality Standards and Wastewater Treatment Requirements* (Idaho Department of Health and Welfare n.d.a). Some Water Body Assessment Guidance assumptions are pending the DEQ Director's approval. Domestic and Agricultural water supplies would be attainable if discharge is equal to or greater than one cubic foot per second. If any other differences between this guidance and the protocol are detected, this guidance is to be used in preference.

Designated Waters (8100)

Q: Are beneficial uses designated for the water body; *Water Quality Standards and Wastewater Treatment Requirements* sections 110. through 160. and 299. (Idaho Department of Health and Welfare n.d.a)?

- Yes; go to decision 8110.
- No; go to decision 8200.

Appropriate Designations (8110)

Compare use designations for the water body to existing beneficial uses and use best professional judgement to determine attainability.

Q: Are designations accurate?

- Yes; go to decision 8200.
- No or unknown; go to process 8300.

Unclassified Waters (8200)

Q: Are there any existing or attainable beneficial uses for the water body?

- Yes; go to process 8300.
- No or unknown; go to process 9000.

Candidates for New Designated Uses (8300)

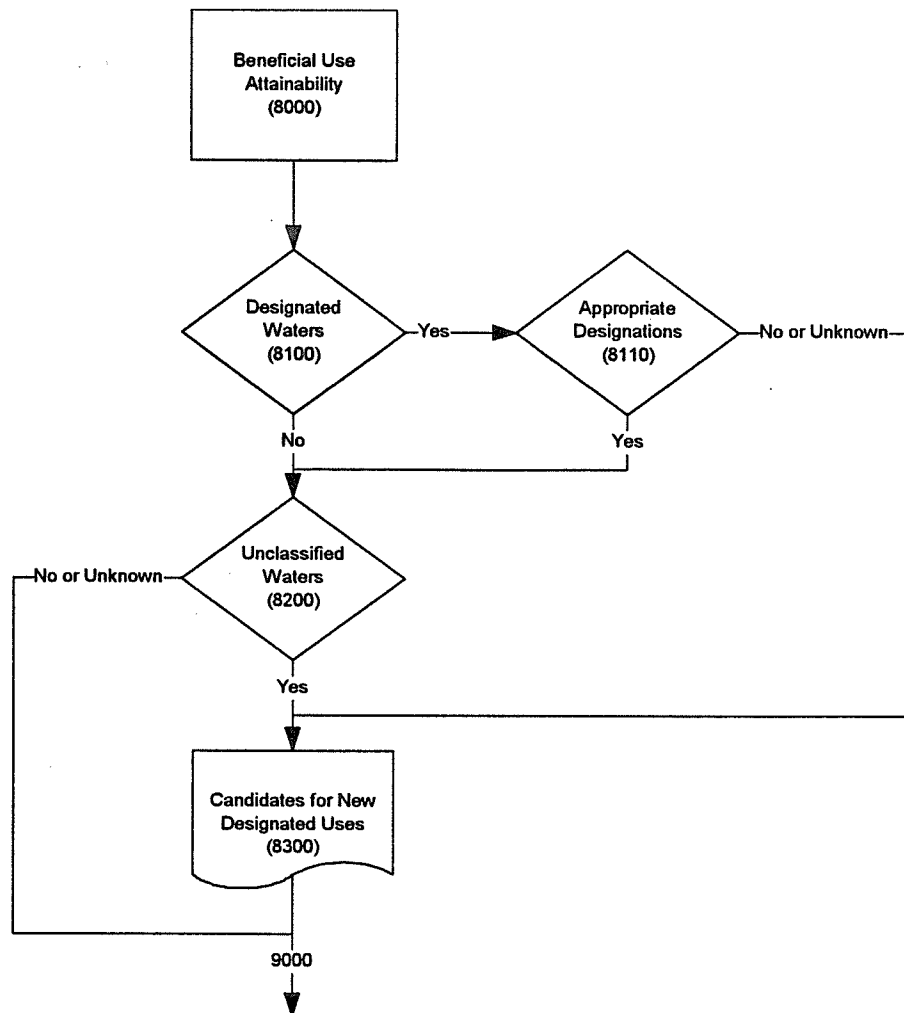
Candidate uses for new designations need to be submitted to the DEQ Regional Administrator and reviewed through public involvement provisions of the applicable Basin Advisory Group. Use attainability analyses will need to be completed if designated uses are proposed for removal or if the candidate uses do not meet fishable and swimmable goals for the water body. These supporting analyses should be

included with the request submitted to the DEQ Regional Administrator. The Water Quality Standards Coordinator can provide consultation on use attainability analyses. The Basin Advisory Group, following public input, should make recommendations to the DEQ Director on the beneficial uses to be designated for the water body. The DEQ Director will take the Basin Advisory Group's recommendations under advisement and proceed to designate water bodies in the *Water Quality Standards and Wastewater Treatment Requirements* during the next triennial rule-making session.

Industrial Water Supply, Wildlife Habitat, and Aesthetics have been identified in the *Water Quality Standards and Wastewater Treatment Requirements* (Idaho Department of Health and Welfare n.d.a) as designated for all waters of the state. Therefore, determining existing use for a water body is purely educational. Existing use is implicit.

The following guidelines can be used to simplify use attainability analyses.

- Presence of cold water indicator macroinvertebrates (Appendix H) or fish (Appendix I) establishes the



- water body as existing for Cold Water Biota.
 - Presence of non-stocked salmonid fishes establishes the water body as existing for Salmonid Spawning.
 - Discharge greater than or equal to five (5) cubic feet per second at the downstream most part of the water body establishes the water body as attainable for Primary Contact Recreation. (Waiting Approval)
 - Discharge greater than or equal to one (1) cubic feet per second at the downstream most part of the water body establishes the water body as attainable for Secondary Contact Recreation, Domestic water Supply, and Agricultural Water Supply. (Waiting Approval)
- ✎ Officially notify the DEQ Regional Administrator of candidates for new designated uses. Appendix M is an example memorandum that can be used to submit candidates for new designations to the DEQ Regional Administrator. Send a copy to DEQ Central Office Water Quality Standards Coordinator.
- Go to process 9000.

Beneficial Uses Status Determinations Appeals Process (9000)

Sometimes data are not complete or need verification. It is unlikely all data are retrieved from other agency, industry, or municipality files even with an exhaustive data search. Additionally, all aspects of every water bodies ecological integrity can not be monitored. Sometimes conclusive determinations are difficult even when they are monitored, that is the ecological indicator scores are near the transition between impairment categories.

The appeals process allows the use of the most complete data to make beneficial use status and attainability determinations. It also allows data greater than five years old to be considered if justification can be made that the water body has not changed over the same time period (*i.e.* no human activities or natural catastrophes).

Appeals should be submitted to the DEQ. Supporting documentation that justifies the appeal should be included. For example, a determination of “Not Full Support” based on the MBI has been made for Cold Water Biota on Deer Creek. A corporate timber industry with land holdings in the watershed wishes to appeal the determination based on fish data collected the previous year. This information along with the appeal is sent to the DEQ Regional Administrator with a copy to the DEQ Central Office, Watershed Monitoring and Analysis Bureau. The assessor then reviews the determination in light of the new information. Modified determinations will then be forwarded to the appropriate Basin Advisory Group and the DEQ Central Office, Watershed Monitoring and Analysis Bureau.

The DEQ Central Office, Watershed Monitoring and Analysis Bureau will be the depository for all appeals. The DEQ regional offices or interested parties may request copies of the appeals to provide consistency state wide or to review how other appeals were handled.

- ☛ Officially notify the DEQ Regional Administrator of beneficial uses status or attainability determinations being appealed with a copy to the Watershed Monitoring and Analysis Bureau in the DEQ Central Office. Appendix N is an example memorandum that can be used to document the process. Supporting data must be included that justifies the appeal of beneficial uses status determinations.
- Go to process 10000.

Listing Water Quality-Limited Water Bodies (10000)

The water body assessor should know the designated and existing beneficial uses after initializing the water body. The next part of the assessment guidance directs the assessor to determine beneficial use status. A water body becomes a candidate for listing as water quality-limited, as required under Section 303(d) of the CWA, once a beneficial use has been determined to be "Not Full Support." Appendix O is an example memorandum that can be used to transmit the information to the DEQ Regional Administrator with a copy to the Water Quality Standards Coordinator in the DEQ Central Office.

Candidate water bodies for listing as water quality-limited should be submitted to the DEQ Regional Administrator. The appropriate Basin Advisory Group shall then prioritize water bodies and conduct a public review of the candidate list. Following the public review, the DEQ Regional Administrator will transmit the list to the DEQ Director for collective submittal of all regional lists to the EPA for approval.

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Glossary

attainable beneficial use or attainable use: A beneficial use, that with appropriate point and nonpoint source controls, a water body could support in the future.

aquatic: Of, or pertaining to, water.

background: The biological, chemical, or physical conditions of waters measured at a point immediately upstream (up gradient) of the influence of an individual point or nonpoint source discharge. If several discharges to the water exist or if an adequate upstream point of measurement is absent, the department will determine where background conditions should be measured.

Basin Advisory Group: A citizen advisory group named by the Idaho Division of Environmental Quality Director, hereafter referred to as Director, in consultation with the designated agencies, for the state's major river basins that shall generally advise the Director on water quality objectives for each basin and work in a cooperative manner with the Director to achieve these objectives.

beneficial use: Any of the various uses that may be made of water, including, but limited to, aquatic biota, recreation in or on the water, water supply, wildlife habitat, and aesthetics.

biota: The plants and animals of a specified area.

designated beneficial use or designated use: A beneficial use assigned to identified waters in the Idaho Department of Health and Welfare Rules, Title 1, Chapter 2, *Water Quality Standards and Wastewater Treatment Requirements*.

criteria: Either a narrative or numerical statement of water quality on which to base judgement of suitability for a beneficial use.

deleterious material: Any nontoxic substances that may cause the tainting of edible species of fish, taste and odors in drinking water supplies, or the reduction of the usability of water without causing injury to water users or aquatic and terrestrial species.

discharge: The amount of water flowing in the stream channel at the time of measurement. Usually expressed as cubic feet per second (cfs).

dissolved oxygen: Molecular oxygen freely available in water and necessary for the respiration of aquatic life and the oxidation of organic materials.

diversity: The condition of being different.

ecological indicator: An analysis, based on metrics, that measures a water bodies environmental integrity (e.g. index of biotic integrity) as compared to a reference condition.

exceedance: When measured values are greater than criteria.

existing beneficial use or existing use: A beneficial use present in waters on or after November 28, 1975, whether or not the use is designated for those waters in the *Water Quality Standards and Wastewater Treatment Requirements*.

Full Support: A category of water quality status. A water body whose status is “Full Support” is in compliance with those levels of water quality criteria listed in Idaho’s *Water Quality Standards and Wastewater Treatment Requirements*, or with reference conditions approved by the Idaho Division of Environmental Quality Director in consultation with the appropriate Basin Advisory Group.

hypolimnion: The deepest zone in a thermally-stratified body of water. It is fairly uniform in temperature and lies beneath a zone of water that exhibits a rapid temperature drop with depth of at least one (1) degree C per meter.

instantaneous: A concentration of a substance measured at any moment (instant) in time.

integrity: An unimpaired condition; the quality or state of being complete.

intergravel dissolved oxygen: The concentrations of dissolved oxygen in the spawning gravel. Considerations for determining spawning gravel include species, water depth, velocity, and substrate.

metric: One discrete measure of an ecological indicator (e.g. number of distinct taxon).

mixing zone: A defined area or volume of the receiving water surrounding or adjacent to a wastewater discharge where the receiving water, as a result of the discharge, may not meet all applicable water quality criteria or standards. It is considered a place where wastewater mixes with receiving water and not as a place where effluents are treated.

natural condition: A condition without human-based disruptions.

Needs Verification: A category of water quality status. A water body whose status is “Needs Verification” has not been assessed, due to need for additional information that will allow distinction between “Full Support” and “Not Full Support.”

nonpoint source: Pollution discharged over a wide land area, not from one specific location.

Not Assessed: A category of water quality status. A water body whose status is “Not Assessed” has not been assessed, due to data limitation.

Not Full Support: A category of water quality status. A water body whose status is “Not Full Support” is not in compliance with those levels of water quality criteria listed in Idaho’s *Water Quality Standards and Wastewater Treatment Requirements*, or with reference conditions approved by the Director in consultation with the appropriate Basin Advisory Group.

point source: Pollution discharged from any identifiable point, including pipes, ditches, channels, sewers, tunnels, and containers of various types.

pollution: Any alteration in the character or quality of the environment that renders it unfit or less suited for beneficial uses.

reconnaissance: An exploratory or preliminary survey of an area.

taxon: A taxonomic group or entity.

reference condition: A condition that fully supports applicable beneficial uses, with little effect from human activity and representing the highest level of support attainable.

water body: A homogeneous classification that can be assigned to rivers, lakes, estuaries, coastlines, or other water features.

water quality: A term used to describe the biological, chemical, and physical characteristics of water with respect to its suitability for a beneficial use.

Appendix A: The Idaho Division of Environmental Quality Macroinvertebrate Biotic Index

Background

The Idaho Division of Environmental Quality (DEQ) has developed a preliminary index, Macroinvertebrate Biotic Index (MBI), using quantitative aquatic macroinvertebrate data. The DEQ MBI has been developed as an analytical tool for assessing Cold or Warm Water Biota beneficial uses for wadable streams in Idaho. Aquatic macroinvertebrates were chosen to represent the biotic condition because they:

- do not usually require permits to collect;
- are ubiquitous;
- are comparatively easy to sample;
- are able to be identified in the laboratory; and
- are a primary food source for fish.

Much of the DEQ's water body assessment process depends on the MBI. The DEQ has chosen to use a multimetric index (*i.e.* an index made up of several metrics) rather than a single metric. Twelve metrics were selected based on similar assessment efforts in the Pacific Northwest (Clark and Maret 1993; Plafkin et al. 1989; Robinson and Minshall 1994). Scatter plots and linear regressions were employed to determine which of the 12 metrics had the strongest relation to the total score. Significant relations were considered to be greater than a correlation coefficient (r^2) of 0.30. Seven metrics emerged from this exercise.

The original method of scoring metrics followed Robinson and Minshall (1994). Scores (1,3,5) were determined based on the 95% confidence interval about the mean absolute value for each metric. For example, a score of five, optimal value, was recorded if the absolute value for a metric was greater than the 95% confidence interval about the mean absolute value for that metric. A score of three was recorded if the absolute value fell within the 95% confidence interval about the mean absolute value, and a one was recorded for an absolute value less than the 95% confidence interval about the mean absolute value for that metric. The method of assessment followed Plafkin et al. (1989) with biotic scores as a percent of the reference on the ordinate (y) axis and habitat scores as a percent of the reference on the abscissa (x) axis. Status determinations were based on percentile deviations.

Some challenges were encountered with this methodology, and the DEQ considered a second approach. The value representing the best condition for a metric within an ecoregion was standardized to one. All metric values were normalized to this value. The DEQ MBI score totals seven. The DEQ ranked the data. In small data sets ($n < 50$), breaks were visually quite pronounced while they tended to be less obvious with larger data sets. It was decided to investigate the slope change from one site to the next to better identify where changes in community structure occurred. This process revealed changes in all ecoregions between 2.7 and 3.1. The range was arbitrarily widened to 2.5 and 3.5 for all ecoregions to be more conservative. It was deemed better to commit a type II error, calling a site "Not Full Support" when in fact it was, verses a type I error, calling a site "Full Support" when it may not have been.

Sample Collection

Sample collection should follow Clark and Maret (1993). They recommended aquatic macroinvertebrate samples be taken from at least three separate riffle habitat units using a modified Hess stream bottom sampler with 0.5 mm mesh. The Surber sampler can be used if conditions do not allow the use of the Hess. Each sample should be preserved separately.

Sample Analysis

Samples should be sent to a taxonomist for species identification. The three samples can either be composited at the laboratory or the data can be composited later. The first 500 individuals should be separated from the detritus. Taxa are then identified and counted.

Data Processing

Computer processing is recommended. The DEQ Macroinvertebrate Data Sheet is entered into a database consisting of the following fields: site identification number; date of collection; Ecoregion; taxon code; taxon level; order; family; genus; species; tolerance value; functional feeding group; and count. A program then calculates the metric values.

Index Calculations

The DEQ MBI consists of seven metrics. Each metric value is calculated from the information entered in the database. Each of the seven metrics has the same potential contribution to the DEQ MBI.

Percent Ephemeroptera, Plecoptera, and Trichoptera (EPT)

This macroinvertebrate metric is a measure of the proportion of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) to the rest of the macroinvertebrates in the sample. This metric is expressed as a percentage. These orders of macroinvertebrates are generally considered to inhabit higher quality water. Therefore, the higher the value for Percent EPT; the better the water quality. The calculation for Percent EPT is as follows:

divide the total number of individuals within the orders Ephemeroptera, Plecoptera, and Trichoptera by the total number of individuals in the sample and multiply by 100.

Hilsenhoff Biotic Index (HBI)(modified)

This macroinvertebrate metric was originally a measure of organic pollution. It has been revised and expanded several times. Taxon respond to organics or toxicants and are useful for evaluating point and nonpoint source affects. Each taxon has an assigned tolerance value. A value of 11 indicates the taxons tolerance is unknown, therefore, the taxon is not included in this metric calculation. The result of this metric is expressed as a value from 0 to 10. (It was originally scaled from 0 to 5 by Hilsenhoff for aquatic arthropod

taxa from rock or gravel riffles in Wisconsin identified to genus or species.) The lower the value for the HBI; the better the water quality. The calculation for the HBI is as follows:

multiply the number of individuals of each species (taxon) by its assigned tolerance value, sum these products, and divide by the total number of individuals in the sample.

Percent Scrapers

Percent scrapers uses a functional feeding group approach to assessment. The relative abundance of scrapers provides an indication of the riffle community food base (periphyton community composition). Scrapers increase with increased abundance of diatoms and decrease as filamentous algae and aquatic mosses increase. Scrapers decrease in relative abundance following sedimentation or organic pollution. Examples of scrapers can be snails, some caddisflies, and flatbodied mayflies. The calculation for Percent Scrapers is as follows:

divide the total number of scrapers by the total number of individuals in the sample and multiply by 100.

Percent Dominance

This macroinvertebrate metric represents the percent contribution of the numerically dominant taxon to the total number of individuals in the community. It provides an indication of community balance at the lowest positive taxonomic level (usually genus or species). A community dominated by relatively few species would suggest environmental stress. The calculation for Percent Dominance is as follows:

divide the total number of the dominant taxon by the total number of individuals in the sample and multiply by 100.

EPT Index

This macroinvertebrate metric summarizes the taxa richness within the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). These are groups considered to be sensitive to pollution. The EPT Index generally increases with increasing water quality. The calculation for EPT Index is as follows:

add the total number of distinct taxa within the orders Ephemeroptera, Plecoptera, and Trichoptera.

Taxa Richness

This macroinvertebrate metric reflects the health of the community through a measure of the variety of taxa (total number of distinct genera or species) present. Taxa richness can be equated to biodiversity. Taxa richness generally increases with increasing water quality, habitat diversity, or habitat suitability. The calculation for Taxa Richness is as follows:

add the total number of distinct taxa in the sample.

Shannon's H' Diversity Index

Species diversity or the evenness of the distribution of individuals in a community has been widely used as a measure of stream community response to pollution. This metric is based on the observation that relatively undisturbed environments support communities having great taxa richness with no individual species present in overwhelming abundance. One of the most popular diversity indices used for water quality assessment,

H' , was published by Shannon and Weaver (1949). It is correctly termed the Shannon-Weiner index because Weiner independently published a similar measure at about the same time (1948). The calculation for Shannon's H' Diversity Index is as follows:

divide the number of individuals of each species (taxon) by the total number of individuals in the sample and multiply by the logarithm base 10 of the same dividend, sum these products, and multiply by a negative one.

Factors to convert between logarithmic bases 2, e, and 10.

to convert to	to convert from		
	2	e	10
2	1.0000	1.4427	3.3219
e	0.6931	1.0000	2.3026
10	0.3010	0.4343	1.0000

Comparing to a Reference

The DEQ has identified the value representing the best condition for each metric by ecoregion based on the Beneficial Use Reconnaissance Project data. These values are considered preliminary reference conditions and are used to normalize each of the seven metrics. They will be updated when additional data is available or further stratification (e.g. geologic type, elevation) is developed. By selecting the value representing the best condition for each metric by ecoregion, the DEQ has established an empirical reference condition based on real data, though no one site consisted of all the best values.

The value representing the best condition, therefore, the reference condition, for each metric was standardized to one. The DEQ MBI has a potential score of seven. The HBI and Percent Dominance macroinvertebrate metrics represent lower water quality as their value increases. Therefore, these 'reversed scale' metrics must be corrected before they are used in calculating the final DEQ MBI score. For the HBI, take ten, the highest value in the metric range, minus the ecoregions reference condition; this is the 'inversed' ecoregional reference condition. Do the same for the site score. Divide the 'inversed' site score by the 'inversed' ecoregion reference condition to get the metric score. Percent Dominance is calculated the same only using a base of 100, since it is a percentage. Preliminary reference conditions are listed in the following table. Use these values to normalize metric values by ecoregion.

Ecoregion	% EPT	HBI	% Scraper	% Dom.	EPT Index	Taxa Richness	H'
Northern Rockies	94	0.5	85	12	38	53	1.34
Northern Basin and Range	92	1.2	78	15	35	53	1.26
Snake River Basin/High Desert	100	2*	78	16	34	42	1.29
Middle Rockies	92	1.4	76	13	26	45	1.2
Columbia Basin	73	2.6	52	14	28	47	1.34
Wyoming Basin	83	1.5	66	19	30	48	1.22
Wasatch and Uinta Mountains	67	3	32	21	29	43	1.07
Blue Mountains	85	1.9	55	12	36	52	1.32

* under investigation

The following is an abridged example of how to calculate the DEQ MBI for the Northern Basin and Range Ecoregion:

$$DEQ\ MBI = \% EPT/92+10-HBI/10-1.2+\% Scraper/78+100-\% Dom./100-15+EPT\ Index/35...$$

Macroinvertebrate Assemblage Determinations

The DEQ MBI score is used to determine the level of macroinvertebrate assemblage impairment.

Not-Impaired

The macroinvertebrate assemblage is determined to be Not-Impaired if the DEQ MBI score is greater than or equal to 3.5.

Impaired

The macroinvertebrate assemblage is determined to be Impaired if the DEQ MBI score is less than or equal to 2.5.

Needs Verification

The macroinvertebrate assemblage Needs Verification if the DEQ MBI score is greater than 2.5 and less than 3.5.

Appendix B: The Idaho Division of Environmental Quality Habitat Index

Background

The Idaho Division of Environmental Quality (DEQ) has developed a preliminary index, Habitat Index (HI), using both quantitative and qualitative habitat data. The DEQ HI has been developed as an analytical tool for assessing Cold or Warm Water Biota beneficial uses for wadable streams in Idaho. A habitat index was chosen to augment the biotic condition. The DEQ HI has been adapted from Hayslip (1993), which is based on the previous work of Pfankuch (1975).

Sample Collection

Sample collection should follow the protocol established in the Beneficial Use Reconnaissance Project Workplan (Idaho Division of Environmental Quality 1996). Qualitative parameters (*e.g.* channel shape, disruptive pressures) should be completed and recorded at the site.

Data Processing

Computer processing is recommended. The DEQ Beneficial Use Reconnaissance Project Field Forms are entered into a database. A program then calculates the quantitative parameters.

Riffle/Run Prevalence

The following parameters are used to assess streams where riffles and runs predominate, or would be expected to predominate, if streams were not affected by human activities. These streams are generally high gradient.

Primary Parameters

1. **BOTTOM SUBSTRATE - PERCENT FINES** [fraction of substrate less than 0.25 inch (6.35 mm) in diameter]:

This parameter is an ocular estimate of the percentage of bottom substrate that is fine materials.

2. **INSTREAM COVER (FISH):**

This parameter is an estimate of the percentage of the stream that provides stable fish habitat. Gravel, cobble, large

woody debris, and undercut banks all provide habitat for fish at some stage of their life cycle.

3. **EMBEDDEDNESS (RIFFLE):**

The degree to which boulders, rubble, or gravel are surrounded by fine sediment [less than 0.25 inch (6.35 mm) in diameter] indicates suitability of the stream substrate as habitat for benthic

macroinvertebrates and fish spawning and egg incubation.

4. VELOCITY/DEPTH:

Velocity in conjunction with depth has a direct influence on benthic and fish assemblages. A greater variety of velocity and depth categories provides better habitat. This parameter breaks velocity and depth into four broad categories: slow/deep; slow/shallow; fast/deep; and fast/shallow.

Secondary Parameters

5. CHANNEL SHAPE (WETTED CHANNEL) [dominant shape]:

This parameter is a characterization of the dominant shape of the wetted stream channel. Trapezoidal channels are those where undercut banks or overhanging vegetation are dominant. Inverse trapezoidal channels are those streams that are, or are fast becoming, wider and shallower and their banks are often unstable and eroding. Rectangular channels are intermediate between the above two shapes.

6. POOL/RIFFLE RATIO [pool length divided by riffle length]:

This parameter assumes a stream with riffles and pools provides a more diverse habitat for fish and macroinvertebrates than a straight or uniform depth stream. This ratio is calculated by dividing the pool length by the riffle length. In some high gradient streams, classical riffles and pools are difficult to detect; being replaced by cascades and pocket water.

7. WIDTH TO DEPTH RATIO (WETTED WIDTH):

This parameter is the ratio of the wetted channel width divided by the wetted channel depth.

Tertiary Parameters

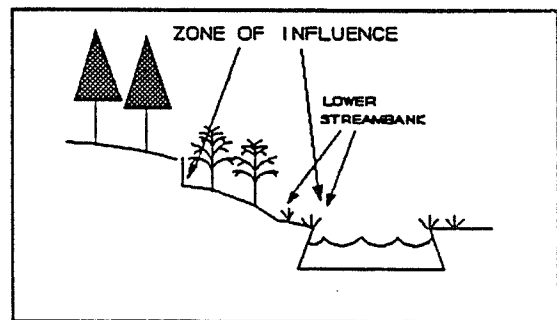
8. BANK VEGETATION PROTECTION:

Bank soil is generally held in place by plant root systems. An estimate of the density of bank vegetation covering the bank provides an indication of bank stability and potential instream sedimentation. Vegetation includes any type of vegetation whether or not it is native vegetation or in good (or bad) condition.

9. LOWER BANK STABILITY:

Lower bank stability is rated by observing existing or potential detachment of soil from the lower streambank and its potential movement into the stream (see Figure 1).

Figure 1. Riparian Areas.



10. DISRUPTIVE PRESSURES (STREAM BANK ADJACENT TO STREAM):

Disruption of the vegetation on the lower streambank immediately adjacent to the stream is detrimental to stream ecosystems. This parameter is an estimate of the amount of plant biomass that remains in the vegetated area immediately adjacent to the stream (see Figure 1).

11. ZONE OF INFLUENCE - WIDTH OF RIPARIAN VEGETATIVE ZONE (least buffered side):

This parameter is an estimate of the width of the area adjacent to the stream that influences the stream. It looks at the width of this zone and the extent of human influence in this zone (see Figure 1).

Glide/Pool Prevalence

The following parameters are used to assess streams where glides and pools predominate, or would be expected to predominate, if streams were not affected by human activities. These streams are generally low gradient and often occur in valleys.

Primary Parameters

1. POOL SUBSTRATE CHARACTERISTIC:

This parameter is an ocular estimate of the substrate materials that make up the pool. Pools with a substrate of gravels and firm sands plus root mats and submerged vegetation are preferable.

2. INSTREAM COVER (FISH):

This parameter is an estimate of the percentage of the stream that provides stable fish habitat. Gravel, cobble, macrophytes, large woody debris, and undercut banks all provide habitat for fish at some stage of their life cycle.

3. POOL VARIABILITY:

This parameter measures the mix of deep, shallow, small and large pools. The more diverse the types of pools, the better the habitat.

4. CANOPY COVER (SHADING):

The amount of shading the stream receives is especially important in low-gradient streams. A mixture of conditions where some areas of the water surface are fully exposed to sunlight and other areas are receiving various degrees of filtered light is optimal.

Secondary Parameters

5. CHANNEL SHAPE (WETTED CHANNEL) [dominant shape]:

This parameter is a characterization of the dominant shape of the wetted stream channel. Trapezoidal channels are those where undercut banks or overhanging vegetation are dominant. Inverse trapezoidal channels are those streams that are, or are fast becoming, wider and shallower and their banks are often unstable and eroding. Rectangular channels are intermediate between the above two shapes.

6. CHANNEL SINUOSITY:

This parameter is a measure of the straightness (or conversely, the sinuosity) of the channel. It is a ratio calculated by dividing the instream channel length by the straight line distance.

7. WIDTH TO DEPTH RATIO (WETTED WIDTH):

This parameter is the ratio of the wetted channel width divided by the wetted channel depth.

Tertiary Parameters

8. BANK VEGETATION PROTECTION:

Bank soil is generally held in place by plant root systems. An estimate of the density of bank vegetation covering the bank provides an indication of bank stability and potential instream

sedimentation. Vegetation includes any type of vegetation whether or not it is native vegetation or in good (or bad) condition.

9. LOWER BANK STABILITY:

Lower bank stability is rated by observing existing or potential detachment of soil from the lower streambank and its potential movement into the stream (see Figure 1).

10. DISRUPTIVE PRESSURES (STREAM BANK ADJACENT TO STREAM):

Disruption of the vegetation on the lower streambank immediately adjacent to the

stream is detrimental to stream ecosystems. This parameter is an estimate of the amount of plant biomass that remains in the vegetated area immediately adjacent to the stream (see Figure 1).

11. ZONE OF INFLUENCE - WIDTH OF RIPARIAN VEGETATIVE ZONE (LEAST BUFFERED SIDE):

This parameter is an estimate of the width of the area adjacent to the stream that influences the stream. It looks at the width of this zone and the extent of human influence in this zone (see Figure 1).

Comparing to a Reference

The DEQ followed a method proposed by Karr et al. (1986) for selecting reference conditions. In this method, the 95th percentile of the ecoregions highest total habitat score, based on the Beneficial Use Reconnaissance Project data, is calculated. This value represents the ecoregional reference condition. These values are considered preliminary. They will be updated when additional data is available or further stratification (e.g. geologic type, elevation) is developed. Preliminary reference conditions are listed in the following table. Use these values to normalize habitat scores by ecoregion.

Ecoregion	Habitat Score
Northern Rockies	128
Northern Basin and Range	102
Snake River Basin/High Desert	110
Middle Rockies	94
Columbia Basin	87
Wyoming Basin	90
Wasatch and Uinta Mountains	85
Blue Mountains	120

Habitat Condition Determinations

The DEQ HI score is used to determine the level of habitat impairment. Others have used percent similarity (Hannaford and Resh 1995, Plafkin et al. 1989) to differentiate between levels of impairment. Impairment thresholds are used as surrogates for traditional statistical tests to detect site differences, thus selection is crucial. The choice of the percentile is arbitrary and reflects confidence in the ability to discern levels of impairment. The impairment thresholds should encompass the anticipated variability, therefore, sites that lie near threshold limits may not be misclassified.

In 1995, the DEQ performed replicate sampling at two sites. Variability in total habitat scores was as high as 23%. Variability could be attributed to crew error, interpretation of written description or qualitative ratings, and natural intra-site variability (Hannaford and Resh 1995). Therefore, the percent similarity thresholds must be greater than this variability to insure sites are not misclassified.

The DEQ has chosen the range of habitat scores by ecoregion to be trisected. A percent similarity of 33% would encompass anticipated variability.

Not-Impaired

The habitat condition is determined to be Not-Impaired if the DEQ HI score is greater than 66% of the ecoregional reference condition.

Impaired

The habitat condition is determined to be Impaired if the DEQ HI is less than 34% of the ecoregional reference condition.

Needs Verification

The habitat condition Needs Verification if the DEQ HI score is greater than or equal to 34% and less than or equal to 66%.

Appendix C: The Idaho Division of Environmental Quality Reconnaissance Index of Biotic Integrity

Background

The Idaho Division of Environmental Quality (DEQ) has developed a preliminary index, Reconnaissance Index of Biotic Integrity (RIBI), using qualitative fish data. The DEQ RIBI has been developed as an analytical tool for assisting in the aquatic life beneficial use status determinations for wadable streams in Idaho.

The DEQ has chosen to use qualitative fish data when the DEQ Macroinvertebrate Biotic Index Needs Verification and the Habitat Index is Not-Impaired or Needs Verification. The DEQ RIBI is based on qualitative data, therefore, criteria, rather than metric calculations, are the basis of the index. Either Not-Impaired or Needs Verification assemblage determinations can be derived from these data. A quantitative index would have to be used to derive an Impaired assemblage determination.

Sample Collection

Fish data from the DEQ Beneficial Use Reconnaissance Project or similar sources can be used. The minimum collection effort must include the following core methods (Idaho Division of Environmental Quality 1996).

- The study site for fish should include all available habitat types present in the reach.
- Electrofish the study site. Electrofish after macroinvertebrates have been sampled and before habitat measurements are taken to minimize site disturbance.
- The survey should include one upstream pass without block nets as a minimum reconnaissance level (qualitative) effort.
- Collect and count all fish.
- Measure total length of each fish of the family Salmonidae collected. Salmonids fishes occurring in Idaho include: rainbow trout/steelhead; cutthroat trout; rainbow/cutthroat trout hybrids; brook trout; bull trout; brook/bull trout hybrids; brown trout; brook/brown trout hybrids (tiger trout); lake trout; brook/lake trout hybrids (splake); golden trout; kokanee/sockeye salmon; coho salmon; chinook salmon; lake whitefish; mountain whitefish; Bear Lake whitefish; pygmy whitefish; Bonneville whitefish; Bonneville cisco; Atlantic salmon; and Arctic grayling. If hundreds of young-of-the-year are collected, a random subset of the total catch of each species may be measured for total length. All young-of-the-year must be counted.
- Voucher up to six (6) specimens of each species at each site as the fish collection permit allows. Voucher according to the addendum to the DEQ protocol #6 (Chandler et al. 1993).
- Record the amount of electrofishing effort (time) spent on the stream site. Record the effort (time) for each pass if multiple passes are made.
- Record the relative proportion of habitat types within the site on the fish data sheet if different from the habitat assessment.

- Estimate length and average width (minimum of five transect measurements) of the stream site electrofished.

Optional Methods

- Quantitative (closed population or mark-recapture) assessment using block nets and multiple passes.
- Record length and weight of all fishes (game and non-game).

Sample Analysis

Vouchered specimens should be sent to a taxonomist for species identification. Confidence Codes (Chandler et al. 1993) should be recorded.

Species pollution tolerance, trophic guild reference, and origin (native or introduced) should be recorded. Use Appendix I as a reference.

A length frequency distribution should be prepared for each salmonid species collected from the site by counting the number of individuals within each length category. Each category is to account for a ten millimeter range in length (*e.g.* 0-10 mm, 10-20 mm). Once categorized, the data should be graphically represented as a histogram.

Data Processing

Computer processing is recommended. The DEQ Fish Data Sheet is entered into a database consisting of the following fields: site identification number; date of collection; Ecoregion; taxon code; taxon level; order; family; genus; species; tolerance value; trophic guild; origin; and count.

Index Criteria

The objective of the DEQ RIBI is to determine whether expectations concerning the fish assemblage have been met or need further conformation. To achieve this objective, the index consists of questions about the structure, tolerance, function, and condition of the fish assemblage. Expectations are defined as taxa and assemblage attributes appropriate for the site being assessed. The following questions are used to assist in determining expectations.

Fish Assemblage Questions

Compare the water body being assessed to a minimally affected site of similar physical and hydrological characteristics in the ecoregion.

Y N Unknown

- | | | | |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Are pollution intolerant species reduced or absent? (Except reductions or absences due to physical barriers or harvest.) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Is the assemblage dominated by pollution tolerant or introduced individuals? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Is the trophic structure of the assemblage dominated by benthic insectivores? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Is the incidence of hybridization with introduced species unusually high? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Does this assemblage have poor age class representation? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Does this assemblage have a high incidence of anomalies? |

Fish Assemblage Determinations

Not-Impaired

If all of the questions are answered no by, or in consultation with, a fisheries biologist with ecoregional experience, then expectations have been met. The site is Not-Impaired based on qualitative data.

Needs Verification

If any of these questions are answered yes or unknown by, or in consultation with, a fisheries biologist with ecoregional experience, then expectations have not been met. The site Needs Verification. Quantitative data is recommended.

**Appendix D: The Idaho Division of Environmental Quality Index
of Biotic Integrity**

(RESERVED)

**Appendix E: The Idaho Division of Environmental Quality Algal
Biotic Index**

(RESERVED)

Appendix F: The Idaho Division of Environmental Quality Water Body Assessment Form

Water Body Initialization				
Water Body Name				
Upstream Limit		Downstream Limit		
WQ Standard		PNRS		
EPA River Reach #		HUC		
Beneficial Uses				
	Designated Use	Existing Use	Attainable Use	Support Status (circle correct)
<input type="checkbox"/> Cold/ <input type="checkbox"/> Warm Water Biota				FS, NFS, NV, NA
Salmonid Spawning				FS, NFS, NA
Primary Contact Recreation				FS, NFS, NA
Secondary Contact Recreation				FS, NFS, NA
Domestic Water Supply				FS, NFS, NA
Agricultural Water Supply				FS, NFS, NA
Industrial Water Supply	X			FS
Wildlife Habitat	X			FS
Aesthetics	X			FS
Criteria Exceedances				
1.				
2.				
3.				
4.				
Assessment Caveats				
Assessor Information				
Name:			Signature	
Affiliation:				
Address:				

Appendix G: The Idaho Division of Environmental Quality Water Body Assessment Guidance Assumptions

Assumptions were made in the 1996 Water Body Assessment Guidance. Each assumption has been proposed to the Idaho Division of Environmental Quality (DEQ) Director for concurrence. Assumptions approved by the Director have the approval date listed in parentheses. Those without dates are pending approval.

General

1. The DEQ will be the only agency making beneficial use attainability determinations using the water body assessment guidance. (Approved 11/8/95)
2. The DEQ will be the only agency making beneficial use status determinations using the water body assessment guidance. (Approved 11/8/95)
3. Status will be determined for designated and existing beneficial uses. (Approved 11/8/95)

Aquatic Life Beneficial Uses

1. A water body can be designated for Cold Water Biota or Warm Water Biota but not both. (Approved 11/8/95)
2. Cold Water Biota is an existing use if the DEQ cold water indicator species, macroinvertebrates or fish, are present on or after November 28, 1975. (Approved 10/6/94)
3. Cold Water Biota and Warm Water Biota status is assessed by the same DEQ bioassessment process. This process will be used until the method is refined, at which time the most current methodologies will be used. (Approved 11/8/95)
4. The DEQ bioassessment process, therefore, the determination of Cold Water Biota or Warm Water Biota beneficial use status, is comprised of the DEQ Macroinvertebrate Biotic Index (MBI) and the DEQ Habitat Index (HI), except in the case where macroinvertebrate data are not available or are not conclusive. Other biological assemblages, the DEQ Reconnaissance Index of Biotic Integrity (RIBI) and potentially the DEQ Index of Biotic Integrity (IBI) or the DEQ Algal Biotic Index (ABI), are used in these situations. (Approved 11/8/95)
5. Cold Water Biota and Warm Water Biota status will be "Full Support", "Not Full Support", "Needs Verification", or "Not Assessed." (Approved 1/17/96)

6. Cold Water Biota and Warm Water Biota status will be “Needs Verification” in the situation where all biological assemblages Needs Verification. (Approved 11/8/95)
7. Salmonid Spawning status can be “Full Support”, “Not Full Support”, or “Not Assessed.” (Approved 1/17/96)
8. Salmonid Spawning can be “Full Support” when Cold Water Biota is “Not Full Support.” (Approved 11/8/95)
9. Salmonid spawning must be occurring as evidenced by salmonid size distributions to conclude Salmonid Spawning is “Full Support.” (Approved 11/8/95)
10. A limited number of aquatic life criteria exceedances do not necessarily indicate a water body is “Not Full Support.” It may suggest the criteria need to be changed either site-specifically or state wide. (Approved 1/17/96)

Recreation and Water Supply Beneficial Uses

1. Recreation and water supply status can be “Full Support”, “Not Full Support”, or “Not Assessed.” (Approved 11/8/95)
2. Recreation and water supply status will be “Full Support” when either Cold Water Biota or Warm Water Biota status is “Full Support”, otherwise status is “Not Assessed.” (Approved 11/8/95)
3. Primary Contact Recreation status will be “Not Full Support” if the water body has two or more beach closures within a five year period. (Approved 1/17/96)
4. Industrial Water Supply status will be “Full Support.” (Approved 1/17/96)
5. A limited number of recreation or water supply criteria exceedances do not necessarily indicate a water body is “Not Full Support.” Site-specific criteria or an exclusion for naturally occurring background levels may be needed. (Approved 1/17/96)
6. Water bodies with one or more cubic foot per second discharge will be attainable for Secondary Contact Recreation, Domestic Water Supply, and Agricultural Water Supply beneficial uses. (Waiting Approval)
7. Water bodies with five or more cubic feet per second discharge will be attainable for Primary Contact Recreation beneficial use. (Waiting Approval)

Wildlife Habitat and Aesthetics Beneficial Uses

1. Wildlife Habitat and Aesthetics status will be “Full Support.” (Approved 11/8/95)

Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
459	Acamptocladus	Diptera	Chironomidae	genus	11	G	
453	Acari	Acari		order	11	R	
640	Acentrella	Ephemeroptera	Baetidae	genus	4	G	
601	Acentrella insignificans	Ephemeroptera	Baetidae	species	4	G	
781	Acentrella turbida	Ephemeroptera	Baetidae	species	4	G	
702	Acentria	Diptera	Pyrilidae	genus	1	H	
4	Aeshnidae	Odonata	Aeshnidae	family	3	R	
588	Agabus	Coleoptera	Dytiscidae	genus	8	R	
171	Agapetus	Trichoptera	Glossosomatidae	genus	0	SC	
643	Agathon	Diptera	Blephariceridae	genus	0	SC	
181	Agraylea	Trichoptera	Hydroptilidae	genus	8	N	
201	Alloosmoecus partitus	Trichoptera	Limnephilidae	species	0	SC	Cold
131	Alloperla	Plecoptera	Chloroperlidae	genus	1	R	
597	Ambrysus	Hemiptera	Naucoridae	genus	11	R	
13	Ameletus	Ephemeroptera	Siphonuridae	genus	0	G	
634	Ameletus connectus McDunnough	Ephemeroptera	Siphonuridae	species	0	G	
579	Ameletus cooki	Ephemeroptera	Siphonuridae	species	0	G	
693	Ameletus similor McDunnough	Ephemeroptera	Siphonuridae	species	0	G	
711	Ameletus sparsatus McDunnough	Ephemeroptera	Siphonuridae	species	0	G	
587	Ameletus validus	Ephemeroptera	Siphonuridae	species	11	G	
14	Ameletus velox	Ephemeroptera	Siphonuridae	species	0	G	
718	Ametropus	Ephemeroptera	Ametropodidae	genus	11	G	
232	Amiocentrus	Trichoptera	Brachycentridae	genus	1	G	
501	Amiocentrus aspilus	Trichoptera	Brachycentridae	species	2	G	
7	Amphiagrion	Odonata	Protoneuridae	genus	5	R	
586	Amphicosmoecus	Trichoptera	Limnephilidae	species	11	H	
82	Amphinemura	Plecoptera	Nemouridae	genus	2	H	
443	Amphipoda	Amphipoda		order	4	G	
249	Amphizoa	Coleoptera	Amphizoidae	genus	1	R	
257	Ampumixis dispar	Coleoptera	Elmidae	species	4	G	
172	Anagapetus	Trichoptera	Glossosomatidae	genus	0	SC	Cold
5	Anax	Odonata	Aeshnidae	genus	8	R	
428	Ancylidae	Basommatophora	Ancylidae	family	6	SC	
444	Anisogammarus	Amphipoda	Gammaridae	genus	4	G	
419	Annelida			phylum	5	G	
454	Anodonta	Pelecypoda	Unionidae	genus	8	F	
574	Anodonta nuttalliana idahoensis	Pelecypoda	Unionidae	species	8	F	
284	Antocha	Diptera	Tipulidae	genus	3	G	
680	Antocha monticola Alexander	Diptera	Tipulidae	species	3	G	
212	Apatania	Trichoptera	Limnephilidae	genus	1	SC	Cold
211	Apataniinae	Trichoptera	Limnephilidae	subfamily	1	SC	
191	Arctopsyche	Trichoptera	Hydropsychidae	genus	1	F	
192	Arctopsyche grandis	Trichoptera	Hydropsychidae	species	2	F	
190	Arctopsychinae	Trichoptera	Hydropsychidae	subfamily	2	F	
8	Argia	Odonata	Coenagrionidae	genus	7	R	
476	Asellidea	Isopoda	Asellidae	family	6	G	
448	Asellus	Isopoda	Asellidae	genus	8	G	
449	Asellus occidentalis	Isopoda	Asellidae	species	8	G	
474	Astacidae	Decapoda	Astacidae	family	8	SC	
311	Atherix	Diptera	Athericidae	genus	2	R	
312	Atherix variagata	Diptera	Athericidae	species	2	R	
258	Atractelmis	Coleoptera	Elmidae	genus	4	G	
37	Attenella	Ephemeroptera	Ephemerellidae	genus	3	G	
38	Attenella delantala	Ephemeroptera	Ephemerellidae	species	3	G	
600	Attenella margarita Needham	Ephemeroptera	Ephemerellidae	species	1	G	
16	Baetidae	Ephemeroptera	Baetidae	family	4	G	
17	Baetis	Ephemeroptera	Baetidae	genus	5	G	
18	Baetis bicaudatus Dodds	Ephemeroptera	Baetidae	species	2	G	Cold
481	Baetis insignificans McDunnough	Ephemeroptera	Baetidae	species	6	G	
19	Baetis intermedius Dodds	Ephemeroptera	Baetidae	species	6	G	
624	Baetis propinquus (Walsh)	Ephemeroptera	Baetidae	species	5	G	
20	Baetis tricaudatus Dodds	Ephemeroptera	Baetidae	species	5	G	

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FFG - Functional Feeding Group (Merritt and Cummins 1988; Pennak 1989; Wisseman 1990)

Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
105	Beloneuria	Plecoptera	Perlidae	genus	3	R	
542	Bezzia	Diptera	Ceratopogonidae	genus	6	G	
592	Blepharicera	Diptera	Blephariceridae	genus	0	SC	
292	Blephariceridae	Diptera	Blephariceridae	family	0	SC	Cold
320	Boreochlus	Diptera	Chironomidae	genus	6	G	
321	Boreoheptagya	Diptera	Chironomidae	genus	6	G	
500	Brachycentridae	Trichoptera	Brachycentridae	family	1	F	
233	Brachycentrus	Trichoptera	Brachycentridae	genus	1	F	
234	Brachycentrus americanus	Trichoptera	Brachycentridae	species	1	F	
235	Brachycentrus occidentalis	Trichoptera	Brachycentridae	species	1	F	
465	Branchiobdellidae	Branchiobdellida	Branchiobdellidae	family	6	G	
322	Brillia	Diptera	Chironomidae	genus	5	H	
323	Brillia flavifrons	Diptera	Chironomidae	species	5	H	
324	Brillia retifinis	Diptera	Chironomidae	species	5	H	
325	Brundiniella	Diptera	Chironomidae	genus	6	R	
536	Brychius	Coleoptera	Halipidae	genus	11	SC	
760	Brychius hornii Cr	Coleoptera	Halipidae	species	5	h	
477	Caecidotea communis	Isopoda	Asellidae	species	6	G	
59	Caenidae	Ephemeroptera	Caenidae	family	7	G	
60	Caenis	Ephemeroptera	Caenidae	genus	7	G	
106	Calineuria	Plecoptera	Perlidae	genus	3	R	
109	Calineuria californica	Plecoptera	Perlidae	species	1	R	
21	Callibaetis	Ephemeroptera	Baetidae	genus	9	G	
137	Callicorixa	Hemiptera	Corixidae	genus	11	R	
752	Calliperla	Plecoptera	Perlidae	genus	2	R	
617	Caloparyphus	Diptera	Stratiomyidae	genus	7	G	
11	Calopteryx	Odonata	Calopterygidae	genus	6	R	
101	Capnia	Plecoptera	Capniidae	genus	1	H	
100	Capniidae	Plecoptera	Capniidae	family	1	H	
280	Carabidae	Coleoptera	Carabidae	family	4	R	
326	Cardiocladius	Diptera	Chironomidae	genus	5	R	
120	Cascadoberla	Plecoptera	Perlidae	genus	2	R	Cold
39	Caudatella	Ephemeroptera	Ephemerellidae	genus	1	G	
779	Caudatella cascadia	Ephemeroptera	Ephemerellidae	species	1	G	
40	Caudatella edmundsi Allen	Ephemeroptera	Ephemerellidae	species	1	SC	
41	Caudatella heterocaudata McDunnoug	Ephemeroptera	Ephemerellidae	species	1	G	possibly Cold
42	Caudatella hystrix Traver	Ephemeroptera	Ephemerellidae	species	1	SC	Cold
138	Cenocorixa	Hemiptera	Corixidae	genus	11	R	
773	Cenocorixa bifida	Hemiptera	Corixidae	species	8	pr	
497	Cenocorixa bifida hungerfordi	Hemiptera	Corixidae	species	11	R	
22	Centropilum	Ephemeroptera	Baetidae	genus	2	G	
611	Ceraclea	Trichoptera	Leptoceridae	genus	5	G	
291	Ceratopogonidae	Diptera	Ceratopogonidae	family	6	R	
327	Chaetocladius	Diptera	Chironomidae	genus	6	G	
306	Chelifera	Diptera	Empididae	genus	6	G	
197	Cheumatopsyche	Trichoptera	Hydropsychidae	genus	5	F	
508	Cheumatopsyche campyla	Trichoptera	Hydropsychidae	species	6	F	
509	Cheumatopsyche enonis	Trichoptera	Hydropsychidae	species	6	F	
510	Cheumatopsyche pettiti	Trichoptera	Hydropsychidae	species	6	F	
593	Chimarra	Trichoptera	Philopotamidae	genus	11	F	
319	Chironomidae	Diptera	Chironomidae	family	6	G	
543	Chironomini	Diptera	Chironomidae	superfamily	6	G	
328	Chironomus	Diptera	Chironomidae	genus	10	G	
130	Chloroperlidae	Plecoptera	Chloroperlidae	family	1	R	
638	Choroterpes	Ephemeroptera	Leptophlebiidae	genus	11	G	
604	Chromagrion	Odonata	Coenagrionidae	genus	6	R	
648	Chrysomelidae	Coleoptera	Chrysomelidae	family	11	H	
652	Chrysops	Diptera	Tabanidae	genus	11	G	
214	Chyranda	Trichoptera	Limnephilidae	genus	1	H	
215	Chyranda centralis	Trichoptera	Limnephilidae	species	1	H	Cold
25	Cinygma	Ephemeroptera	Heptageniidae	genus	4	SC	COLD
728	Cinygma integrum Eaton	Ephemeroptera	Heptageniidae	species	2	SC	

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FFG - Functional Feeding Group (Merritt and Cummins 1988; Pennak 1989; Wiseman 1990)

Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
26	Cinygmula	Ephemeroptera	Heptageniidae	genus	4	SC	
107	Claassenia	Plecoptera	Perlidae	genus	3	R	
108	Claassenia sabouloso (Banks)	Plecoptera	Perlidae	species	3	R	
440	Cladocera	Cladocera		order	8	F	
329	Cladotanytarsus	Diptera	Chironomidae	genus	7	G	
259	Cleptelmis	Coleoptera	Elmidae	genus	4	G	
260	Cleptelmis ornata	Coleoptera	Elmidae	species	4	G	
307	Clinocera	Diptera	Empididae	genus	6	R	
703	Clostocia	Trichoptera	Limnephilidae	genus	1	H	
6	Coenagrionidae	Odonata	Coenagrionidae	family	9	R	
533	Coleoptera	Coleoptera		order	11	R	
671	Collembola	Collembola		order	10	G	
330	Conchapelopia	Diptera	Chironomidae	genus	6	R	
331	Constempellina	Diptera	Chironomidae	genus	6	G	
441	Copepoda			subclass	8	G	
636	Coptotomus	Coleoptera	Dytiscidae	genus	11	R	
670	Cordulegaster	Odonata	Cordulegasteridae	genus	0	R	
139	Corisella	Hemiptera	Corixidae	genus	11	R	
136	Corixidae	Hemiptera	Corixidae	family	10	N	
551	Corticacarus delicatus	Hydracarina	Hydracarinae	species	8	R	
150	Corydalidae	Megaloptera	Corydalidae	family	0	R	
332	Corynoneura	Diptera	Chironomidae	genus	7	G	
277	Crenitis	Coleoptera	Hydrophilidae	genus	5	R	
333	Cricotopus	Diptera	Chironomidae	genus	7	H	
334	Cricotopus bicinctus	Diptera	Chironomidae	species	7	H	
335	Cricotopus festivellus	Diptera	Chironomidae	species	7	H	
336	Cricotopus isocladus	Diptera	Chironomidae	species	7	H	
337	Cricotopus nostoccladius	Diptera	Chironomidae	species	7	H	
338	Cricotopus tremulus	Diptera	Chironomidae	species	7	H	
339	Cricotopus trifasciata	Diptera	Chironomidae	species	7	H	
472	Crustacea			class	8	G	
202	Cryptochia	Trichoptera	Limnephilidae	genus	0	H	COLD
340	Cryptochironomus	Diptera	Chironomidae	genus	8	R	
724	Crysmelidae	Coleoptera		family			
293	Culicidae	Diptera	Culicidae	family	8	G	
503	Culoptila cantha	Trichoptera	Glossosomatidae	species	0	SC	
116	Cultus	Plecoptera	Perlidae	genus	2	R	COLD
682	Curculionidae	Coleoptera	Curculionidae	family	11	H	
762	Cyclopoida	Crustacea		suborder	8	F	
749	Daphnia	Crustacea	Daphniidae	genus	8	F	
450	Decapoda	Decapoda		order	8	H	
662	Deronectes	Coleoptera	Dytiscidae	genus	5	R	
684	Deronectes striatellus LeConte	Coleoptera	Dytiscidae	species	5	R	
578	Despaxia	Plecoptera	Leuctridae	genus	0	H	
94	Despaxia augusta	Plecoptera	Leuctridae	species	0	H	
294	Deuterophlebia	Diptera	Deuterophlebiidae	genus	0	SC	
583	Deuterophlebia nielsoni Kennedy	Diptera	Deuterophlebiidae	species	11	SC	
664	Deuterophlebiidae	Diptera	Deuterophlebiidae	family	11	SC	Cold
341	Diamesa	Diptera	Chironomidae	genus	5	G	
575	Diamesinae	Diptera	Chironomidae	subfamily	11	G	
458	Diaptomus pribilofensis	Eucopepoda	Diaptomidae	species	11	N	
200	Dicosmoecinae	Trichoptera	Limnephilidae	subfamily	1	SC	
203	Dicosmoecus	Trichoptera	Limnephilidae	genus	1	H	
204	Dicosmoecus atripes	Trichoptera	Limnephilidae	species	1	R	Cold
205	Dicosmoecus gilvipes	Trichoptera	Limnephilidae	species	2	SC	
285	Dicranota	Diptera	Tipulidae	genus	3	R	
342	Dicrotendipes	Diptera	Chironomidae	genus	8	G	
468	Dina	Pharyngodellida	Erpobdellidae	species	8	R	
679	Dipheter hageni	Ephemeroptera	Baetidae	species	5	G	
736	Diplectrona	Trichoptera	Hydropsychidae	genus	0	F	
281	Diptera	Diptera		order	7	N	
117	Diura knowltoni	Plecoptera	Perlidae	species	2	SC	Cold

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Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
296	Dixa	Diptera	Dixidae	genus	1	G	
675	Dixella	Diptera	Dixidae	genus	11	G	
295	Dixidae	Diptera	Dixidae	family	1	G	
78	Doddsia occidentalis	Plecoptera	Taeniopterygidae	species	2	SC	
698	Dolochopodidae	Diptera	Dolochopodidae	family	4	R	
188	Dolophilodes	Trichoptera	Philopotamidae	genus	1	G	Cold
110	Doroneuria	Plecoptera	Perlidae	genus	1	R	Cold
111	Doroneuria baumanni	Plecoptera	Perlidae	species	1	R	Cold
112	Doroneuria theodora	Plecoptera	Perlidae	species	1	R	Cold
45	Drunella	Ephemeroptera	Ephemerellidae	species	0	R	
44	Drunella coloradensis Dodds	Ephemeroptera	Ephemerellidae	species	0	R	
622	Drunella coloradensis/flavilinea	Ephemeroptera	Ephemerellidae	species group	0	R	
43	Drunella doddsi Needham	Ephemeroptera	Ephemerellidae	species	0	SC	Cold
46	Drunella flavilinea McDunnough	Ephemeroptera	Ephemerellidae	species	1	SC	
51	Drunella grandis Eaton	Ephemeroptera	Ephemerellidae	species	1	G	
47	Drunella pelosa Mayo	Ephemeroptera	Ephemerellidae	species	0	SC	Cold
48	Drunella spinifera Needham	Ephemeroptera	Ephemerellidae	species	0	R	Cold
591	Drunella spinifera/grandis	Ephemeroptera	Ephemerellidae	species group	0	R	
534	Dryopidae	Coleoptera	Dryopidae	family	5	H	
261	Dubiraphia	Coleoptera	Elmidae	genus	4	G	
780	Dubiraphia giullianii	Coleoptera	Elmidae	species	6	SC	
607	Dugesia	Tricladida	Planariidae	genus	4	M	
608	Dugesia tigrina (Girard)	Tricladida	Planariidae	species	4	M	
251	Dytiscidae	Coleoptera	Dytiscidae	family	5	R	
206	Ecclisocosmoecus scylla	Trichoptera	Limnephilidae	species	0	H	Cold
207	Ecclisomyia	Trichoptera	Limnephilidae	genus	2	G	Cold
343	Einfeldia	Diptera	Chironomidae	genus	8	G	
621	Elephantomyia	Diptera	Tipulidae	genus	11	H	
253	Elmidae	Coleoptera	Elmidae	family	4	G	
305	Empididae	Diptera	Empididae	family	6	R	
9	Enallagma	Odonata	Coenagrionidae	genus	9	R	
344	Endochironomus	Diptera	Chironomidae	genus	10	H	
478	Entocytheridae	Podocopa	Entocytheridae	family	11	N	
687	Entomobryidae	Collembola	Entomobryidae	family	11	G	
666	Eocosmoecus	Trichoptera	Limnephilidae	genus	11	H	Cold
686	Eocosmoecus schmidi (Wiggins)	Trichoptera	Limnephilidae	species	11	H	cold
27	Epeorus	Ephemeroptera	Heptageniidae	genus	0	SC	
28	Epeorus albertae	Ephemeroptera	Heptageniidae	species	0	SC	
29	Epeorus deceptivus	Ephemeroptera	Heptageniidae	species	0	SC	Possibly Cold
32	Epeorus grandis	Ephemeroptera	Heptageniidae	species	0	SC	Cold
30	Epeorus iron	Ephemeroptera	Heptageniidae	species	0	SC	
31	Epeorus longimanus	Ephemeroptera	Heptageniidae	species	0	SC	
729	Ephemerella	Ephemeroptera	Ephemeridae	genus	4	G	
49	Ephemerella	Ephemeroptera	Ephemerellidae	genus	1	G	
656	Ephemerella alleni Jensen and Edmund	Ephemeroptera	Ephemerellidae	species	11	G	
50	Ephemerella aurivillii (Bengtsson)	Ephemeroptera	Ephemerellidae	species	0	G	
52	Ephemerella inermis Eaton	Ephemeroptera	Ephemerellidae	species	1	H	
657	Ephemerella infrequens McDunnough	Ephemeroptera	Ephemerellidae	species	1	G	
616	Ephemerella infrequens/inermis	Ephemeroptera	Ephemerellidae	species group	11	G	
36	Ephemerellidae	Ephemeroptera	Ephemerellidae	family	1	G	
731	Ephemeridae	Ephemeroptera	Ephemeridae	family	4	G	
480	Ephemeroptera	Ephemeroptera		order	11	G	
488	Ephoron	Ephemeroptera	Polymitarcyidae	species	2	G	
314	Ephydriidae	Diptera	Ephydriidae	family	6	G	
767	Erioptera	Diptera	Tipulidae	genus	3	G	
467	Erpobdellidae	Pharyngodellida	Erpobdellidae	family	8	R	
423	Eubranchiopoda			class	8	F	
279	Eubrianix	Coleoptera	Psephenidae	species	4	SC	
103	Eucapnopsis brevicauda	Plecoptera	Capniidae	species	1	H	
775	Eucorethra	Diptera	Chaoboridae	genus	7	R	
345	Eukiefferiella	Diptera	Chironomidae	genus	8	G	
346	Eukiefferiella brehmi	Diptera	Chironomidae	species	8	G	

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Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
347	Eukiefferiella brevicealcar	Diptera	Chironomidae	species	8	G	
348	Eukiefferiella claripennis	Diptera	Chironomidae	species	8	G	
349	Eukiefferiella devonica	Diptera	Chironomidae	species	8	G	
350	Eukiefferiella gracei	Diptera	Chironomidae	species	8	G	
351	Eukiefferiella pseudomontana	Diptera	Chironomidae	species	8	G	
548	Euparyphus	Diptera	Stratiomyidae	genus	11	G	
618	Euparyphus	Diptera	Stratiomyidae	genus	11	G	
667	Farula	Trichoptera	Uenoidae	genus	11	SC	Cold
429	Ferrissia	Basommatophora	Ancylidae	genus	6	SC	
598	Ferrissia rivularis Allen & Cheatum	Limnophila	Ancylidae	species	11	SC	
437	Fluminicola	Mesogastropoda	Hydrobiidae	genus	5	SC	
562	Fontelicella	Mesogastropoda	Hydrobiidae	genus	8	SC	
563	Fossaria	Limnophila	Lymnaeidae	genus	8	SC	
118	Frisonia picticeps	Plecoptera	Perlodidae	species	2	R	Possibly Cold
445	Gammarus	Amphipoda	Gammaridae	genus	4	M	
677	Gammarus lacustris Sars	Amphipoda	Gammaridae	species	4	M	
427	Gastropoda			class	7	SC	
495	Gelastocoridae	Hemiptera	Gelastocoridae	family	11	R	
496	Gelastocoris	Hemiptera	Gelastocoridae	genus	11	R	
143	Gerridae	Hemiptera	Gerridae	family	5	R	
144	Gerris	Hemiptera	Gerridae	genus	11	R	
145	Gerris buenoi	Hemiptera	Gerridae	species	5	R	
146	Gerris remigis	Hemiptera	Gerridae	species	5	R	
470	Glossiphonia complanta (Linnaeus)	Rhynchobdellida	Glossiphoniidae	species	8	R	
469	Glossiphoniidae	Rhynchobdellida	Glossiphoniidae	family	8	R	
691	Glossophonia	Rhynchobdellida	Glossiphoniidae	genus	10	R	
173	Glossosoma	Trichoptera	Glossosomatidae	genus	0	SC	
174	Glossosoma alascense Banks	Trichoptera	Glossosomatidae	species	0	SC	
175	Glossosoma intermedium	Trichoptera	Glossosomatidae	species	0	SC	
504	Glossosoma montana Ross	Trichoptera	Glossosomatidae	species	0	SC	
176	Glossosoma oregonense Ling	Trichoptera	Glossosomatidae	species	0	SC	
177	Glossosoma penitum Banks	Trichoptera	Glossosomatidae	species	0	SC	
609	Glossosoma sp 1	Trichoptera	Glossosomatidae	species	4	SC	
610	Glossosoma sp 2	Trichoptera	Glossosomatidae	species	0	SC	
178	Glossosoma wenatchee Ross and Spenc	Trichoptera	Glossosomatidae	species	0	SC	
170	Glossosomatidae	Trichoptera	Glossosomatidae	family	0	SC	
316	Glutops	Diptera	Pelecorhynchidae	genus	3	R	
761	Glyphopsyche	Trichoptera	Limnephilidae	genus	1	H	
224	Goera archaon	Trichoptera	Limnephilidae	species	1	SC	
223	Goerinae	Trichoptera	Limnephilidae	subfamily	1	SC	
1	Gomphidae	Odonata	Gomphidae	family	1	R	
425	Gonidea	Unionoida	Unionidae	genus	4	F	
499	Gonidea angulata	Pelecypoda	Unionidae	species	8	F	
254	Gonielmis	Coleoptera	Elmidae	genus	5	G	
140	Graptocorixa	Hemiptera	Corixidae	genus	11	R	
246	Grensia	Trichoptera	Limnephilidae	genus	6	H	
240	Gumaga	Trichoptera	Sericostomatidae	genus	3	H	
658	Gymnopais	Diptera	Simuliidae	genus	11	SC	
431	Gyraulus	Basommatophora	Planorbidae	genus	8	SC	
274	Gyrinus	Coleoptera	Gyrinidae	genus	5	R	
748	Haemopsis marmorata (Say)	Hirudinea	Hirudinidae	species	10	R	
275	Haliplidae	Coleoptera	Haliplidae	family	7	H	
641	Haliplius	Coleoptera	Haliplidae	genus	7	H	
352	Heleniella	Diptera	Chironomidae	genus	6	G	
250	Helichus	Coleoptera	Dryopidae	genus	5	H	
535	Helichus striatus foveatus	Coleoptera	Dryopidae	species	5	H	
764	Helichus striatus LeConte	Coleoptera	Dryopidae	species	5	H	
238	Helicopsyche	Trichoptera	Helicopsychidae	genus	3	SC	
239	Helicopsyche borealis	Trichoptera	Helicopsychidae	species	3	SC	
507	Helicopsychidae	Trichoptera	Helicopsychidae	family	3	SC	
422	Helobdella stagnalis (L.)	Rhynchobdellida	Glossiphoniidae	species	10	R	
654	Helophorus	Coleoptera	Hydrophilidae	genus	11	H	

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Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
308	Hemerodromia	Diptera	Empididae	genus	6	R	
635	Hemerodromia/Chelifera	Diptera	Empididae	genera	6	R	
494	Hemiptera	Hemiptera		order	11	R	
34	Heptagenia	Ephemeroptera	Heptageniidae	genus	4	SC	
676	Heptagenia criddlei McDunnough	Ephemeroptera	Heptageniidae	species	4	SC	
482	Heptagenia elegantula	Ephemeroptera	Heptageniidae	species	4	SC	
741	Heptagenia simplicioides McDunnough	Ephemeroptera	Heptageniidae	species	4	SC	
24	Heptageniidae	Ephemeroptera	Heptageniidae	family	4	SC	
287	Hesperoconopa	Diptera	Tipulidae	genus	1	G	Possibly cold
141	Hesperocorixa	Hemiptera	Corixidae	genus	11	N	
660	Hesperoperla	Plecoptera	Perlidae	genus	11	R	
113	Hesperoperla pacifica (Banks)	Plecoptera	Perlidae	species	1	R	
216	Hesperophylax	Trichoptera	Limnephilidae	genus	5	H	
262	Heterlimnius	Coleoptera	Elmidae	genus	4	G	
263	Heterlimnius corpulentus	Coleoptera	Elmidae	species	4	G	
241	Heteroplectron californicum	Trichoptera	Calamoceratidae	species	1	H	
353	Heterotrissocladius subpilosus	Diptera	Chironomidae	species	0	G	
286	Hexatoma	Diptera	Tipulidae	genus	2	R	
668	Himalopsyche	Trichoptera	Rhyacophilidae	genus	11	R	Cold
421	Hirudinea			class	10	R	
420	Hirudinidae	Gnathobdellida	Hirudinidae	family	7	R	
217	Homophylax	Trichoptera	Limnephilidae	genus	0	H	Cold
455	Homoptera	Hemiptera		suborder	8	H	
446	Hyallala azteca	Amphipoda	Talitridae	species	8	G	
218	Hydatophylax	Trichoptera	Limnephilidae	genus	1	H	
456	Hydracarina	Hydracarina		order	8	R	
774	Hydraena	Coleoptera	Hydraenidae	genus	5	R	
723	Hydraenidae	Coleoptera	Hydraenidae	family	5	R	
354	Hydrobaenus	Diptera	Chironomidae	genus	8	SC	
560	Hydrobiidae	Mesogastropoda	Hydrobiidae	family	11	SC	Cold
705	Hydrobius	Coleoptera	Hydrophilidae	genus	8	R	
650	Hydrochus	Coleoptera	Hydrophilidae	genus	11	H	
276	Hydrophilidae	Coleoptera	Hydrophilidae	family	5	R	
198	Hydropsyche	Trichoptera	Hydropsychidae	genus	4	F	
511	Hydropsyche californica	Trichoptera	Hydropsychidae	species	4	F	
512	Hydropsyche occidentalis	Trichoptera	Hydropsychidae	species	4	F	
513	Hydropsyche osleri	Trichoptera	Hydropsychidae	species	4	F	
196	Hydropsychidae	Trichoptera	Hydropsychidae	family	4	F	
182	Hydroptila	Trichoptera	Hydroptilidae	genus	6	SC	
514	Hydroptila ajax	Trichoptera	Hydroptilidae	species	6	SC	
515	Hydroptila arctica	Trichoptera	Hydroptilidae	species	6	SC	
516	Hydroptila argosa	Trichoptera	Hydroptilidae	species	6	SC	
180	Hydroptilidae	Trichoptera	Hydroptilidae	family	4	N	
688	Hydrovatus	Coleoptera	Dytiscidae	genus	11	R	
552	Hygrobatas occidentalis	Hydracarina	Hygrobatidae	species	8	R	
550	Hygrobatidae	Hydracarina	Hygrobatidae	family	8	R	
595	Hygrotus	Coleoptera	Dytiscidae	genus	11	R	
457	Hymenoptera	Hymenoptera		order	8	A	
669	Imania	Trichoptera	Limnephilidae	genus	11	SC	Cold
721	Incertus	Ephemeroptera	Baetidae	genus	5	G	
479	Insecta			class	11	N	
33	Ironodes	Ephemeroptera	Heptageniidae	genus	4	SC	
715	Ironopsis grandis	Ephemeroptera	Heptageniidae	species	3	SC	
491	Ischnura	Odonata	Coenagrionidae	genus	9	R	
493	Isogenus	Plecoptera	Perlodidae	genus	2	R	
127	Isoperla	Plecoptera	Perlodidae	genus	2	R	
128	Isoperla fulva	Plecoptera	Perlodidae	species	2	R	
129	Isoperla fusca	Plecoptera	Perlodidae	species	2	R	
447	Isopoda	Isopoda		order	8	G	
438	Juga	Mesogastropoda	Pleuroceridae	genus	7	SC	
132	Kathroperla perdita	Plecoptera	Chloroperlidae	species	1	G	
119	Kogotus	Plecoptera	Perlodidae	genus	2	R	

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Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
659	Lacobi	Coleoptera	Hydrophilidae	genus	11	R	
754	Lanx	Gastropoda	Lymnaeidae	genus	6	G	
596	Lara	Coleoptera	Elmidae	genus	4	H	
264	Lara avara	Coleoptera	Elmidae	species	4	H	
355	Larsia	Diptera	Chironomidae	genus	6	R	
554	Lebertia	Hydracarina	Lebertiidae	genus	8	R	
553	Lebertiidae	Hydracarina	Lebertiidae	family	8	R	
532	Lepidoptera	Lepidoptera		order	6	H	
237	Lepidostoma	Trichoptera	Lepidostomatidae	genus	1	H	
522	Lepidostoma cinereum	Trichoptera	Lepidostomatidae	species	3	H	
722	Lepidostoma quercina	Trichoptera	Lepidostomatidae	species	1	H	
521	Lepidostomatidae	Trichoptera	Lepidostomatidae	family	3	H	
242	Leptoceridae	Trichoptera	Leptoceridae	family	4	G	
62	Leptophlebia	Ephemeroptera	Leptophlebiidae	genus	2	G	
61	Leptophlebiidae	Ephemeroptera	Leptophlebiidae	family	2	G	
135	Lethocerus	Hemiptera	Belostomatidae	genus	11	R	
517	Leucotrichia	Trichoptera	Hydroptilidae	genus	6	SC	
93	Leuctridae	Plecoptera	Leuctridae	family	0	H	Cold
649	Libellula	Odonata	Libellulidae	genus	9	R	
199	Limnephilidae	Trichoptera	Limnephilidae	family	4	H	
213	Limnephilinae	Trichoptera	Limnephilidae	subfamily	4	H	
219	Limnephilus	Trichoptera	Limnephilidae	genus	5	H	
283	Limnophila	Diptera	Tipulidae	genus	4	R	
646	Limnophora	Diptera	Muscidae	genus	11	R	
356	Limnophyes	Diptera	Chironomidae	genus	8	G	
745	Limnopus	Hemiptera	Gerridae	genus	11	R	
288	Limonia	Diptera	Tipulidae	genus	6	H	
357	Lopescladius	Diptera	Chironomidae	genus	6	G	
710	Lumbriculidae	Oligochaeta	Lumbriculidae	family	8	G	
564	Lymnaea	Limnophila	Lymnaeidae	genus	8	SC	
430	Lymnaeidae	Limnophila	Lymnaeidae	family	6	SC	
460	Macronema	Trichoptera	Hydropsychidae	genus	3	F	
358	Macropelopia	Diptera	Chironomidae	genus	6	R	
83	Malenka	Plecoptera	Nemouridae	genus	2	H	
720	Manophylax	Trichoptera	Limnephilidae	genus	11	SC	
426	Margaritifera	Unionida	Unionidae	genus	4	F	
576	Margaritifera margaritifera fal	Pelecypoda	Margaritiferidae	species	8	F	
298	Maruina	Diptera	Psychodidae	genus	1	SC	
95	Megaleuctra	Plecoptera	Leuctridae	genus	0	H	Cold
121	Megarcys	Plecoptera	Perlidae	genus	2	R	Cold
236	Micrasema	Trichoptera	Brachycentridae	genus	1	H	
709	Micrasema bactro	Trichoptera	Brachycentridae	species	1	H	
538	Microcyllopus pusillus	Coleoptera	Elmidae	genus	2	G	
778	Microcyllopus pusillus foveatus	Coleoptera	Elmidae	species/subspe	4	SC	
537	Microcyllopus similis	Coleoptera	Elmidae	species	2	G	
360	Micropsectra	Diptera	Chironomidae	genus	7	G	
361	Microtendipes	Diptera	Chironomidae	genus	6	F	
147	Microvelia	Hemiptera	Veliidae	genus	11	R	
559	Molluska			phylum	11	SC	
362	Monodiamesa	Diptera	Chironomidae	genus	7	G	
359	Monopelopia	Diptera	Chironomidae	genus	6	R	
644	Mooreobdella	Gnathobdellida	Hirudinidae	genus	11	R	
96	Moselia infusata	Plecoptera	Leuctridae	species	0	H	Cold
208	Moselyana	Trichoptera	Limnephilidae	genus	4	G	Cold
313	Muscidae	Diptera	Muscidae	family	6	R	
243	Mystacides	Trichoptera	Leptoceridae	genus	4	G	
463	Naididae	Haplotaxida	Naididae	family	11	G	
363	Nanocladius	Diptera	Chironomidae	genus	3	G	
265	Narpus	Coleoptera	Elmidae	genus	4	G	
266	Narpus concolor	Coleoptera	Elmidae	species	4	G	
148	Naucoridae	Hemiptera	Naucoridae	family	5	R	
590	Neaviperla	Plecoptera	Chloroperlidae	genus	11	R	

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Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
639	Nectopsyche	Trichoptera	Leptoceridae	genus	3	N	
523	Nectopsyche gracilis	Trichoptera	Leptoceridae	species	3	SC	
524	Nectopsyche halia	Trichoptera	Leptoceridae	species	3	SC	
525	Nectopsyche lahontanensis	Trichoptera	Leptoceridae	species	3	SC	
526	Nectopsyche stigmatica	Trichoptera	Leptoceridae	species	3	SC	
417	Nematoda			phylum	5	A	
727	Nematomorpha			Phylum	11	A	
81	Nemouridae	Plecoptera	Nemouridae	family	2	H	
629	Neoclpeodytes	Coleoptera	Dytiscidae	genus	11	R	
225	Neophylax	Trichoptera	Limnephilidae	genus	3	SC	
226	Neophylax occidentalis	Trichoptera	Limnephilidae	species	3	SC	cold
227	Neophylax rickeri	Trichoptera	Limnephilidae	species	3	SC	
228	Neophylax splendens	Trichoptera	Limnephilidae	species	3	SC	
229	Neothremma	Trichoptera	Uenoidae	genus	0	SC	Cold
585	Neothremma	Trichoptera	Uenoidae	genus	11	SC	cold
230	Neothremma alicia	Trichoptera	Uenoidae	species	0	SC	Cold
594	Neotrichia	Trichoptera	Hydroptilidae	genus	11	SC	
520	Neotrichia halia	Trichoptera	Hydroptilidae	species	4	H	
627	Nephelopsis obscura	Hirudinea	Erpobdellidae		11	R	
725	Nerophilus	Trichoptera	Odontoceridae	genus	0	M	
719	Nerophilus californicus	Trichoptera	Odontoceridae	species	0	M	
364	Nilotanyus	Diptera	Chironomidae	genus	6	R	
365	Nimbocera	Diptera	Chironomidae	genus	6	F	
483	Nixe criddlei	Ephemeroptera	Heptageniidae	genus	2	H	
484	Nixe simplicioides	Ephemeroptera	Heptageniidae	species	2	H	
655	Noteridae	Coleoptera	Noteridae	family	11	R	
717	Nyctiophylax	Trichoptera	Polycentropodidae	genus	5	F	
183	Ochrotrichia	Trichoptera	Hydroptilidae	genus	4	G	
518	Ochrotrichia	Trichoptera	Hydroptilidae	genus	4	R	
742	Ochthebius sculptus	Coleoptera	Hydraenidae	species	5	R	
2	Octogomphus	Odonata	Gomphidae	genus	1	R	
490	Odonata	Odonata		order	11	R	
366	Odontomesa	Diptera	Chironomidae	genus	4	G	
695	Odontomyia	Diptera	Stratiomyidae	genus	5	G	
244	Oecetis	Trichoptera	Leptoceridae	genus	8	R	
418	Oligochaeta			class	5	G	
231	Oligophlebodes	Trichoptera	Limnephilidae	genus	1	SC	Cold
502	Oligospectrum	Trichoptera	Brachycentridae	genus	1	G	
367	Oliveridia	Diptera	Chironomidae	genus	6	G	
209	Onocosmoecus	Trichoptera	Limnephilidae	genus	1	H	
527	Onocosmoecus unicolor	Trichoptera	Limnephilidae	genus	2	H	
3	Ophiogomphus	Odonata	Gomphidae	genus	1	R	
267	Optioservus	Coleoptera	Elmidae	genus	4	SC	
539	Optioservus castanipennis	Coleoptera	Elmidae	species	4	SC	
540	Optioservus divergens	Coleoptera	Elmidae	species	4	SC	
268	Optioservus quadrimaculatus	Coleoptera	Elmidae	species	4	SC	
269	Optioservus seriatus	Coleoptera	Elmidae	species	4	SC	
628	Ordobrevia	Coleoptera	Elmidae	genus	4	N	
270	Ordobrevia nubrifera	Coleoptera	Elmidae	species	4	G	
252	Oreodytes	Coleoptera	Dytiscidae	genus	5	R	
712	Oreodytes congruus	Coleoptera	Dytiscidae	species	5	R	
580	Oreogeton	Diptera	Empididae	genus	5	A	Cold
309	Oreothalia	Diptera	Empididae	genus	6	R	
708	Ormosia	Diptera	Tipulidae	genus	3	G	
151	Orohermes	Megaloptera	Corydalidae	genus	0	R	
122	Oroperla	Plecoptera	Perlodidae	genus	2	R	
544	Orthocladini	Diptera	Chironomidae	supergen	6	G	
369	Orthocladius	Diptera	Chironomidae	genus	6	G	
368	Orthocladius complex	Diptera	Chironomidae	species	6	G	
370	Orthocladius eudactylocadius	Diptera	Chironomidae	species	6	G	
371	Orthocladius euorthocladius	Diptera	Chironomidae	species	6	G	
372	Orthocladius pogonocladius	Diptera	Chironomidae	genus	6	G	

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Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
519	Orthotrichia	Trichoptera	Hydroptilidae	genus	6	SC	
442	Ostracoda			subclass	8	G	
602	Oxyethira	Trichoptera	Hydroptilidae	genus	11	H	
765	Oxythira	Trichoptera	Hydroptilidae	genus	3	H	
561	Pacifastacus	Decapoda	Cambaridae	genus	6	M	
475	Pacifastacus cambilii	Decapoda	Astacidae	species	6	H	
451	Pacifastacus connectens	Decapoda	Astacidae	species	6	H	
452	Pacifastacus leniusculus	Decapoda	Astacidae	species	6	H	
373	Pagastia	Diptera	Chironomidae	genus	1	G	
776	Palpomyia	Diptera	Ceratopogonidae	genus	6	R	
102	Paracapnia	Plecoptera	Capniidae	genus	1	H	
374	Parachaetocladius	Diptera	Chironomidae	genus	6	G	
759	Paradixa	Diptera	Dixidae	subgenus	2	G	
375	Parakiefferiella	Diptera	Chironomidae	genus	6	G	
63	Paraleptophlebia	Ephemeroptera	Leptophlebiidae	genus	1	G	
64	Paraleptophlebia bicornuta	Ephemeroptera	Leptophlebiidae	species	4	G	
633	Paraleptophlebia debilis (Walker)	Ephemeroptera	Leptophlebia	species	11	G	
486	Paraleptophlebia heteronea	Ephemeroptera	Leptophlebiidae	species	2	G	
740	Paraleptophlebia memorialis (Eaton)	Ephemeroptera	Leptophlebiidae	species	4	G	
97	Paraleuctra	Plecoptera	Leuctridae	genus	0	H	Cold
98	Paraleuctra occidentalis	Plecoptera	Leuctridae	species	0	H	Cold
376	Paramerina	Diptera	Chironomidae	genus	6	R	
377	Parametriocnemus	Diptera	Chironomidae	genus	5	G	
133	Paraperla	Plecoptera	Chloroperlidae	genus	1	R	
714	Paraperla frontalis (Banks)	Plecoptera	Chloroperlidae	species	0	R	
378	Paraphaenocladus	Diptera	Chironomidae	genus	5	G	
193	Parapsyche	Trichoptera	Hydropsychidae	genus	1	R	
194	Parapsyche almota	Trichoptera	Hydropsychidae	species	3	R	
195	Parapsyche elsis Milne	Trichoptera	Hydropsychidae	species	1	R	Cold
549	Parasitengona			genus	11	N	
379	Paratanytarsus	Diptera	Chironomidae	genus	6	G	
380	Paratendipes	Diptera	Chironomidae	genus	8	G	
381	Paratrichocladius	Diptera	Chironomidae	genus	6	G	
382	Parorthocladius	Diptera	Chironomidae	genus	6	G	
530	Psychomyiidae	Trichoptera	Psychomyiidae	family	6	G	
289	Pedicia	Diptera	Tipulidae	genus	6	R	
210	Pedomoecus sierra	Trichoptera	Limnephilidae	species	0	SC	Cold
315	Pelecorhynchidae	Diptera	Pelecorhynchidae	family	3	R	Cold
566	Pelecypoda	Pelecypoda		order	8	F	
647	Peltodytes	Coleoptera	Halipidae	genus	11	H	
72	Peltoperlidae	Plecoptera	Peltoperlidae	family	2	H	Cold
589	Pentacora	Hemiptera	Saldidae	genus	11	R	
384	Pentaneura	Diptera	Chironomidae	genus	6	R	
383	Pentaneurini	Diptera	Chironomidae	subfamily	6	R	
777	Percymoorensis	Hirudinea	Hirudinidae	genus	10	R	
299	Pericoma	Diptera	Psychodidae	genus	4	G	
104	Perlidae	Plecoptera	Perlidae	family	1	R	
673	Perlinodes	Plecoptera	Perlodidae	genus	11	R	
123	Perlinodes aurea	Plecoptera	Perlodidae	species	2	R	
114	Perlodidae	Plecoptera	Perlodidae	family	2	R	
99	Perlomyia	Plecoptera	Leuctridae	genus	0	H	
248	Petrophila	Lepidoptera	Pyralidae	genus	5	SC	
385	Phaenopsectra	Diptera	Chironomidae	genus	7	SC	
187	Philopotamidae	Trichoptera	Philopotamidae	family	3	F	
704	Phychodidae	Diptera		family	10	G	
433	Physa	Limnophila	Physidae	genus	8	SC	
434	Physella	Basommatophora	Physidae	genus	8	SC	
432	Physidae	Basommatophora	Physidae	family	8	SC	
661	Phytobius	Coleoptera	Curculionidae	genus	11	H	
124	Pictetiella expansa	Plecoptera	Perlodidae	species	2	R	
555	Piersigiidae	Hydracarina	Piersigiidae	family	8	R	
623	Piscicola	Rhynchobdellida	Piscicolidae	genus	10	R	

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471	<i>Piscicola salmositica</i>	Rhynchobdellida	Piscicolidae	species	7	R	
424	Pisidiidae	Veneroida	Pisidiidae	family	8	G	
435	Pisidium	Pelecypoda	Sphaeriidae	genus	8	F	
568	<i>Pisidium casertanum</i>	Pelecypoda	Sphaeriidae	species	8	SC	
570	<i>Pisidium compressum</i>	Pelecypoda	Sphaeriidae	species	8	F	
569	<i>Pisidium idahoense</i>	Pelecypoda	Sphaeriidae	species	8	F	
768	Placobdella	Hirundinea	Glossiphoniidae	genus	6	R	
462	Planariidae	Tricladida	Planariidae	family	1	M	
436	Planorbidae	Basommatophora	Planorbidae	family	7	SC	
492	Plecoptera	Plecoptera		order	11	R	
584	Plumiperla	Plecoptera	Chloroperlidae	genus	11	R	
84	Podmosta	Plecoptera	Nemouridae	genus	2	H	
757	Polycleles	Turbellaria	Planariidae	genus	6	G	
619	<i>Polycelis coronata</i> (Girard)	Tricladida	Planariidae	species	1	M	
529	Polycentropidae	Trichoptera	Polycentropidae	family	6	F	
185	Polycentropus	Trichoptera	Polycentropodidae	genus	6	R	
487	Polymitarcidae	Ephemeroptera	Polymitarcyidae	family	2	G	
386	Polypedilum	Diptera	Chironomidae	genus	6	H	
387	<i>Polypedilum pentapedilum</i>	Diptera	Chironomidae	species	6	H	
701	Potamopyrgus	Mesogastropoda	Hydrobiidae	genus	10	SC	
388	<i>Potthastia gaedii</i>	Diptera	Chironomidae	species	6	G	
389	<i>Potthastia longimana</i>	Diptera	Chironomidae	species	2	G	
390	Procladius	Diptera	Chironomidae	genus	9	R	
391	Prodiamesa	Diptera	Chironomidae	genus	3	G	
439	Promentus	Basommatophora	Planorbidae	genus	6	G	
302	Prosimulium	Diptera	Simuliidae	genus	3	F	
85	Prostoia besametsa	Plecoptera	Nemouridae	species	2	H	
726	Protoplasa	Diptera	Chironomidae	genus	5	G	
653	<i>Protoplasa fitchii</i> Osten Sacken	Diptera	Tanyderidae	species	1	N	
179	Protoptila	Trichoptera	Glossosomatidae	genus	1	SC	
505	<i>Protoptila coloma</i>	Trichoptera	Glossosomatidae	species	1	SC	
506	<i>Protoptila tenebrosa</i>	Trichoptera	Glossosomatidae	species	1	SC	
556	<i>Protzia californensis</i>	Hydracarina	Piersigiidae	species	8	R	
392	Psectrocladius	Diptera	Chironomidae	genus	8	G	
393	<i>Psectrocladius allopsectroclad</i>	Diptera	Chironomidae	species	8	G	
394	<i>Psectrocladius limbatellus</i>	Diptera	Chironomidae	species	8	G	
395	<i>Psectrocladius sordidellus</i>	Diptera	Chironomidae	species	8	G	
396	<i>Psectrotanypus</i>	Diptera	Chironomidae	genus	10	R	
278	Psephenidae	Coleoptera	Psephenidae	family	4	SC	
674	Psephenus	Coleoptera	Psephenidae	genus	4	SC	
541	<i>Psephenus falli</i>	Coleoptera	Psephenidae	species	4	SC	
397	Pseudochironomus	Diptera	Chironomidae	genus	5	G	
23	Pseudocloeon	Ephemeroptera	Baetidae	genus	4	SC	
398	Pseudodiamesa	Diptera	Chironomidae	genus	6	G	
399	Pseudorthocladius	Diptera	Chironomidae	genus	0	G	
297	Psychodidae	Diptera	Psychodidae	family	10	G	
220	Psychoglypha	Trichoptera	Limnephilidae	genus	1	G	Cold
221	<i>Psychoglypha bella</i>	Trichoptera	Limnephilidae	species	2	G	
222	<i>Psychoglypha subborealis</i>	Trichoptera	Limnephilidae	species	2	G	
606	Psychomyia	Trichoptera	Psychomyiidae	genus	2	SC	
186	<i>Psychomyia lumina</i>	Trichoptera	Psychomyiidae	species	2	SC	
66	Pteronarcella	Plecoptera	Pteronarcyidae	genus	0	H	
67	<i>Pteronarcella badia</i>	Plecoptera	Pteronarcyidae	species	0	H	
68	<i>Pteronarcella regularis</i>	Plecoptera	Pteronarcyidae	species	0	H	
65	Pteronarcyidae	Plecoptera	Pteronarcyidae	family	0	H	
69	Pteronarcys	Plecoptera	Pteronarcyidae	genus	0	H	
70	<i>Pteronarcys californica</i>	Plecoptera	Pteronarcyidae	species	0	H	
739	<i>Pteronarcys dorsata</i> (Say)	Plecoptera	Pteronarcyidae	species	0	H	
71	<i>Pteronarcys princeps</i>	Plecoptera	Pteronarcyidae	species	0	H	Possibly Cold
651	Ptychoptera	Diptera	Ptychopteridae	genus	7	G	
300	Ptychopteridae	Diptera	Ptychopteryidae	family	7	G	
247	Pyrilidae	Lepidoptera	Pyrilidae	family	5	H	

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FFG - Functional Feeding Group (Merritt and Cummins 1988; Pennak 1989; Wisseman 1990)

Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
615	Rhabdomastix	Diptera	Tipulidae	genus	8	R	
743	Rhagorelia distincta	Hemiptera	Veliidae	species	11	R	
400	Rheocricotopus	Diptera	Chironomidae	genus	6	G	
401	Rheotanytarsus	Diptera	Chironomidae	genus	6	F	
35	Rhithrogena	Ephemeroptera	Heptageniidae	genus	0	SC	
485	Rhithrogena hageni Eaton	Ephemeroptera	Heptageniidae	species	0	G	
694	Rhithrogena morrisoni/hageni	Ephemeroptera	Heptageniidae	species group	0	SC	
625	Rhithrogena robusta Dodds	Ephemeroptera	Heptageniidae	species	0	G	
255	Rhizelmis	Coleoptera	Elmidae	genus	1	SC	
464	Rhyacodrilus sodalis	Haplotaxida	Tubificidae	species	10	G	
153	Rhyacophila	Trichoptera	Rhyacophilidae	genus	0	R	
154	Rhyacophila acropedes Banks	Trichoptera	Rhyacophilidae	species	1	R	
631	Rhyacophila acropedes/vao	Trichoptera	Rhyacophilidae	Acropedes gro	0	R	
155	Rhyacophila alberta Banks	Trichoptera	Rhyacophilidae	species	0	R	Cold
156	Rhyacophila angelita Banks	Trichoptera	Rhyacophilidae	species	0	R	
162	Rhyacophila arnaldi Denning	Trichoptera	Rhyacophilidae	species	0	R	
157	Rhyacophila betteni Ling	Trichoptera	Rhyacophilidae	species	0	R	
581	Rhyacophila bifila Banks	Trichoptera	Rhyacophilidae	species	0	R	
165	Rhyacophila blarina Ross	Trichoptera	Rhyacophilidae	species	0	R	
158	Rhyacophila br nnea Banks	Trichoptera	Rhyacophilidae	species	0	R	
159	Rhyacophila coloradensis Banks	Trichoptera	Rhyacophilidae	species	0	R	
603	Rhyacophila grandis	Trichoptera	Rhyacophilidae	species	1	R	
160	Rhyacophila hyalinata Banks	Trichoptera	Rhyacophilidae	species	0	R	
161	Rhyacophila iranda	Trichoptera	Rhyacophilidae	species	0	R	Cold
166	Rhyacophila navas Navas	Trichoptera	Rhyacophilidae	species	0	R	
642	Rhyacophila oreia group	Trichoptera	Rhyacophilidae	species group	0	R	
167	Rhyacophila pellisa	Trichoptera	Rhyacophilidae	species	0	R	
771	Rhyacophila rayneri	Trichoptera	Rhyacophilidae	species	0	pr	
163	Rhyacophila rotunda Banks	Trichoptera	Rhyacophilidae	species	0	R	
164	Rhyacophila sibirica	Trichoptera	Rhyacophilidae	species	0	R	
678	Rhyacophila tucula Ross	Trichoptera	Rhyacophilidae	species	11	N	
613	Rhyacophila vaccua Milne	Trichoptera	Rhyacophilidae	species	0	R	
758	Rhyacophila vaefes group	Trichoptera	Rhyacophilidae	species group	1	R	
753	Rhyacophila vaeter group	Trichoptera	Rhyacophilidae	species group	1	R	
168	Rhyacophila vagrita Milne	Trichoptera	Rhyacophilidae	species	0	R	Cold
713	Rhyacophila valuma	Trichoptera	Rhyacophilidae	species	1	R	
612	Rhyacophila vepula Milne	Trichoptera	Rhyacophilidae	species	0	N	
169	Rhyacophila verrula Milne	Trichoptera	Rhyacophilidae	species	0	H	Cold
152	Rhyacophilidae	Trichoptera	Rhyacophilidae	family	0	R	
696	Rickera	Plecoptera	Perlodidae	genus	11	R	
665	Rickera sorpta (Needham & Claassen)	Plecoptera	Perlodidae	species	2	R	
706	Saldidae	Hemiptera	Saldidae	family	10	R	
699	Saldula	Hemiptera	Saldidae	genus	10	R	
782	Sciaridae	Diptera	Sciaridae	family	11		
690	Sepdon	Diptera	Sciomyzidae	species	11	R	
582	Sericostomatidae	Trichoptera	Sericostomatidae	family	11	H	cold
53	Serratella	Ephemeroptera	Ephemerellidae	genus	2	G	
645	Serratella teresa Traver	Ephemeroptera	Ephemerellidae	species	11	G	
54	Serratella tibialis McDunnough	Ephemeroptera	Ephemerellidae	species	2	G	
125	Setvena bradleyi (Smith)	Plecoptera	Perlodidae	species	2	R	
149	Sialis	Megaloptera	Sialidae	genus	4	R	
142	Sigara	Hemiptera	Corixidae	genus	11	N	
498	Sigara alternata	Hemiptera	Corixidae	species	11	N	
763	Sigara washingtonensis	Hemiptera	Corixidae	species	8	G	
599	Silvius	Diptera	Tabanidae	genus	11	R	
301	Simuliidae	Diptera	Simuliidae	family	6	F	
303	Simulium	Diptera	Simuliidae	genus	6	F	
546	Simulium bivattatum	Diptera	Simulidae	species	6	F	
547	Simulium vittatum	Diptera	Simulidae	species	6	F	
12	Siphonuridae	Ephemeroptera	Siphonuridae	family	7	G	
15	Siphonurus	Ephemeroptera	Siphonuridae	genus	7	G	
126	Skwala	Plecoptera	Perlodidae	genus	2	R	

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Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
73	Soliperla	Plecoptera	Peltoperlidae	genus	2	H	Possibly Cold
750	Somatochlora	Odonata	Libellulidae	genus	9	R	
86	Soyedina	Plecoptera	Nemouridae	genus	2	H	
558	Sperchon pseudoplumifer	Hydracarina	Sperchonidae	species	8	R	
557	Sperchonidae	Hydracarina	Sperchonidae	family	8	R	
730	Sperchopsis	Coleoptera	Hydrophilidae	genus	5	R	
567	Sphaeriidae	Pelecypoda	Sphaeriidae	family	8	F	
571	Sphaerium patella	Pelecypoda	Sphaeriidae	species	8	F	
572	Sphaerium striatum	Pelecypoda	Sphaeriidae	species	8	F	
184	Stactobiella	Trichoptera	Hydroptilidae	genus	2	H	
605	Stagnicola	Limnophila	Lymnaeidae	genus	10	SC	
681	Stagnicola/Fossaria	Limnophila	Lymnaeidae	genera	11	SC	
614	Staphylinidae	Coleoptera	Staphylinidae	family	8	R	
402	Stempellina	Diptera	Chironomidae	genus	2	G	
403	Stempellinella	Diptera	Chironomidae	genus	4	G	
256	Stenelmis	Coleoptera	Elmidae	genus	7	SC	
700	Stenonema	Ephemeroptera	Heptageniidae	genus	2	SC	
317	Stratiomyidae	Diptera	Stratiomyidae	family	8	G	
405	Subletta	Diptera	Chironomidae	genus	6	F	
577	Suwallia	Plecoptera	Chloroperlidae	genus	1	R	
707	Suwallia/Neaviperla	Plecoptera	Chloroperlidae	genera	1	R	
134	Sweltsa	Plecoptera	Chloroperlidae	species	1	R	
404	Symbiocladius	Diptera	Chironomidae	genus	6	A	
406	Sympothastia	Diptera	Chironomidae	genus	2	G	
407	Synorthocladius	Diptera	Chironomidae	genus	2	G	
318	Tabanidae	Diptera	Tabanidae	family	8	R	
697	Tabanus	Diptera	Tabanidae	genus	5	R	
692	Tachopteryx	Odonata	Petaluridae	genus	10	R	
79	Taenionema	Plecoptera	Taeniopterygidae	genus	2	SC	
80	Taenionema pallidum	Plecoptera	Taeniopterygidae	species	2	SC	
77	Taeniopterygidae	Plecoptera	Taeniopterygidae	family	2	H	
473	Talitridae	Amphipoda	Talitridae	family	8	G	
716	Tanyderidae	Diptera	Tanyderidae	family	11		
545	Tanytarsini	Diptera	Chironomidae	supergenus	6	F	
408	Tanytarsus	Diptera	Chironomidae	genus	6	F	
732	Thaumalea	Diptera	Thaumaleidae	genus	11	M	
734	Thaumalea elnora	Diptera	Thaumaleidae	species	11	M	
735	Thaumalea fusca	Diptera	Thaumaleidae	species	11	M	
733	Thaumaleidae	Diptera	Thaumaleidae	family	11	M	
626	Theromyzon	Rhynchobdellida	Glossiphoniidae	genus	10	R	
410	Thienemannimyia	Diptera	Chironomidae	genus	6	R	
409	Thienemanniola	Diptera	Chironomidae	genus	6	G	
55	Timpanoga hecuba	Ephemeroptera	Ephemerellidae	species	7	G	
290	Tipula	Diptera	Tipulidae	genus	4	H	
282	Tipulidae	Diptera	Tipulidae	family	3	H	
756	Tipulidae ormosia	Diptera	Tipulidae	species	4	M	
632	Trepobates	Hemiptera	Gerridae	genus	10	R	
672	Trepobates	Hemiptera	Gerridae	genus	10	R	
245	Triaenodes	Trichoptera	Leptoceridae	genus	6	H	
744	Trichoptera	Trichoptera		order			
461	Tricladida	Tricladida		order	4	G	
56	Tricorythidae	Ephemeroptera	Tricorythidae	family	4	G	
57	Tricorythodes	Ephemeroptera	Tricorythidae	genus	5	G	
58	Tricorythodes minutus	Ephemeroptera	Tricorythidae	species	4	G	
531	Trissopelopia	Diptera	Chironomidae	genus	11	R	
746	Tropisternus	Coleoptera	Hydrophilidae	genus	5	R	
466	Tubifex	Tubificida	Tubificidae	genus	10	G	
489	Tubificidae	Tubificida	Tubificidae	family	10	G	
416	Turbellaria			class	4	R	
411	Tvetenia	Diptera	Chironomidae	genus	5	G	
412	Tvetenia bavarica	Diptera	Chironomidae	species	5	G	
413	Tvetenia discoloripes	Diptera	Chironomidae	species	5	G	

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Appendix H: Macroinvertebrate Taxa List for Idaho

Taxon Code	Scientific Name	Order	Family	Taxon Level	TV	FFG	Temp Pref
304	Twinnia	Diptera	Simuliidae	genus	6	F	
683	Uenoidae	Trichoptera	Uenoidae	family	0	SC	
573	Unionidae	Pelecypoda	Unionidae	family	8	F	
738	Valvata	Gastropoda	Valvatidae	genus	8	SC	
637	Valvatidae	Mesogastropoda	Valvatidae	family	11	SC	
620	Visoka	Plecoptera	Nemouridae	genus	11	SC	
87	Visoka cataractae	Plecoptera	Nemouridae	genus	1	H	Cold
737	Viviparidae	Trichoptera	Viviparidae	family	6	SC	
565	Vorticifex	Limnophila	Planorbidae	genus	8	SC	
663	Wandesia	Hydracarina	Protziidae	genus	11	N	
310	Wiedemannia	Diptera	Empididae	genus	6	R	
189	Wormaldia	Trichoptera	Philopotamidae	genus	3	F	
528	Wormaldia gabriella	Trichoptera	Rhyacophilidae	species	3	SC	
74	Yoraperla	Plecoptera	Peltoperlidae	genus	2	H	
75	Yoraperla brevis	Plecoptera	Peltoperlidae	species	2	H	Cold
76	Yoraperla mariana	Plecoptera	Peltoperlidae	species	2	H	Cold
115	Yugus	Plecoptera	Perlodidae	genus	2	R	Possibly Cold
271	Zaitzevia	Coleoptera	Elmidae	genus	4	G	
272	Zaitzevia milleri	Coleoptera	Elmidae	species	4	G	
273	Zaitzevia parvula	Coleoptera	Elmidae	species	4	G	
88	Zapada	Plecoptera	Nemouridae	genus	2	H	
89	Zapada cinctipes	Plecoptera	Nemouridae	species	2	H	
90	Zapada columbiana	Plecoptera	Nemouridae	species	2	H	
91	Zapada frigida	Plecoptera	Nemouridae	species	2	H	Cold
92	Zapada oregonensis	Plecoptera	Nemouridae	species	2	H	
414	Zavrelia	Diptera	Chironomidae	genus	8	G	
415	Zavrelimyia	Diptera	Chironomidae	genus	8	R	
10	Zoniagrion	Odonata	Coenagrionidae	genus	9	R	
685	600 Porifera				11	N	
630	600 Brachycera	Diptera			11	N	
689	600 Hydra				11	N	
747	600 Forcipomyiinae				11	N	
755	600 Tinodes				11	N	
783	600 Nixe				11		
766	600 Metacnephia	Diptera	Simuliidae		11		

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Appendix I: Fish Taxa List for Idaho

Non-Hybrids

Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
3	American Shad	<i>Alosa sapidissima</i>	GENSPE	Clupeidae	MI	F	I	warm
20	Arctic Char	<i>Salvelinus alpinus</i>	GENSPE	Salmonidae	II	I	I	cold
24	Arctic Grayling	<i>Thymallus arcticus</i>	GENSPE	Salmonidae	II	I	I	cold
18	Atlantic Salmon	<i>Salmo salar</i>	GENSPE	Salmonidae	II	I	I	cold
93	Bass	<i>Micropterus sp.</i>	GENUS	Centrarchidae				warm
71	Bear Lake Sculpin	<i>Cottus extensus</i>	GENSPE	Cottidae	MI	V	N	cold
12	Bear Lake Whitefish	<i>Prosopium abyssicola</i>	GENSPE	Salmonidae	MI	V	N	cold
48	Black Bullhead	<i>Ameiurus melas</i>	GENSPE	Ictaluridae	MT	I	I	warm
64	Black Crappie	<i>Pomoxis nigromaculatus</i>	GENSPE	Centrarchidae	MT	O	I	cool
60	Bluegill	<i>Lepomis macrochirus</i>	GENSPE	Centrarchidae	MT	I	I	warm
45	Bluehead Sucker	<i>Catostomus discobolus</i>	GENSPE	Catostomidae	MT	I	N	cold
14	Bonneville Cisco	<i>Prosopium gemmifer</i>	GENSPE	Salmonidae	MT	V	N	cold
15	Bonneville Whitefish	<i>Prosopium splanchnotis</i>	GENSPE	Salmonidae	MT	I	N	cold
44	Bridgelip Sucker	<i>Catostomus columbianus</i>	GENSPE	Catostomidae	TT	H	N	cold
21	Brook Trout	<i>Salvelinus fontinalis</i>	GENSPE	Salmonidae	MI	I	I	cold
49	Brown Bullhead	<i>Ameiurus nebulosus</i>	GENSPE	Ictaluridae	TT	I	I	warm

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Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
19	Brown Trout	<i>Salmo trutta</i>	GENSPE	Salmonidae	MI	C	I	cold
104	Bullhead	<i>Ameiurus sp.</i>	GENUS	Ictaluridae				warm
22	Bull Trout	<i>Salvelinus confluentus</i>	GENSPE	Salmonidae	II	I	N	cold
54	Burbot	<i>Lota lota</i>	GENSPE	Gadidae	MT	P	N	cold
30	Common Carp	<i>Cyprinus carpio</i>	GENSPE	Cyprinidae	TT	O	I	warm
90	Catfish	<i>Ictalurus sp.</i>	GENUS	Ictaluridae				warm
100	Catfish	<i>Ictaluridae</i>	FAMILY					warm
50	Channel Catfish	<i>Ictalurus punctatus</i>	GENSPE	Ictaluridae	MT	G	I	warm
81	Char	<i>Salvelinus sp.</i>	GENUS	Salmonidae				cold
9	Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	GENSPE	Salmonidae	II	I	N	cold
27	Chiselmouth	<i>Acrocheilus alutaceus</i>	GENSPE	Cyprinidae	TT	O	N	cold
84	Chub	<i>Couesius sp.</i>	GENUS	Cyprinidae				
85	Chub	<i>Gila sp.</i>	GENUS	Cyprinidae				
5	Chum Salmon	<i>Oncorhynchus keta</i>	GENSPE	Salmonidae	II	I	I	cold
105	Cod	<i>Lota sp.</i>	GENUS	Gadidae				cold
6	Coho Salmon	<i>Oncorhynchus kisutch</i>	GENSPE	Salmonidae	II	I	N	cold
94	Crappie	<i>Pomoxis sp.</i>	GENUS	Centrarchidae				cool
11	Cutthroat Trout	<i>Oncorhynchus clarki</i>	GENSPE	Salmonidae	II	I	N	cold
87	Dace	<i>Rhinichthys sp.</i>	GENUS	Cyprinidae				
35	Fathead Minnow	<i>Pimephales promelas</i>	GENSPE	Cyprinidae	TT	O		warm
52	Flathead Catfish	<i>Pylodictis olivaris</i>	GENSPE	Ictaluridae	MT	P		warm

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Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
17	Golden Trout	<i>Oncorhynchus aguabonita</i>	GENSPE	Salmonidae	II	I	I	cold
28	Goldfish	<i>Carassius auratus</i>	GENSPE	Cyprinidae	TT	O	I	warm
82	Grayling	<i>Thymallus sp.</i>	GENUS	Salmonidae				cold
57	Green Sunfish	<i>Lepomis cyanellus</i>	GENSPE	Centrarchidae	TT	I	I	warm
56	Guppy	<i>Poecilia reticulata</i>	GENSPE	Poeciliidae	TT	O	I	warm
101	Guppy	<i>Poeciliidae</i>	FAMILY					warm
97	Herring	<i>Clupeidae</i>	FAMILY					warm
8	Kokanee	<i>Oncorhynchus nerka</i>	GENSPE	Salmonidae	II	V	I	cold
29	Lake Chub	<i>Couesius plumbeus</i>	GENSPE	Cyprinidae	MT	I	N	cold
23	Lake Trout	<i>Salvelinus namaycush</i>	GENSPE	Salmonidae	II	P	I	cold
4	Lake Whitefish	<i>Coregonus clupeaformis</i>	GENSPE	Salmonidae	MI	V	I	cold
75	Lamprey	<i>Lampetra sp.</i>	GENUS	Petromyzontidae				cold
62	Largemouth Bass	<i>Micropterus salmoides</i>	GENSPE	Centrarchidae	MI	C	I	warm
46	Largescale Sucker	<i>Catostomus macrocheilus</i>	GENSPE	Catostomidae	TT	I	N	cold
33	Leatherside Chub	<i>Gila copei</i>	GENSPE	Cyprinidae	MT	I	N	cold
38	Leopard Dace	<i>Rhinichthys falcatus</i>	GENSPE	Cyprinidae	MI	I	N	cold
37	Longnose Dace	<i>Rhinichthys cataractae</i>	GENSPE	Cyprinidae	MI	I	N	cold
43	Longnose Sucker	<i>Catostomus catostomus</i>	GENSPE	Catostomidae	TT	I	N	cold

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Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
99	Minnows	<i>Cyprinidae</i>	FAMILY					
67	Mottled Sculpin	<i>Cottus bairdi</i>	GENSPE	Cottidae	MI	I	N	cold
47	Mountain Sucker	<i>Catostomus platyrhynchus</i>	GENSPE	Catostomidae	MT	H	N	cold
16	Mountain Whitefish	<i>Prosopium williamsoni</i>	GENSPE	Salmonidae	MI	I	N	cold
26	Northern Pike	<i>Esox lucius</i>	GENSPE	Esocidae	MI	P	I	cool
36	Northern Squawfish	<i>Ptychocheilus oregonensis</i>	GENSPE	Cyprinidae	TT	C	N	cool
1	Pacific Lamprey	<i>Lampetra tridentata</i>	GENSPE	Petromyzontidae	MT	A	N	cold
68	Piute Sculpin	<i>Cottus beldingi</i>	GENSPE	Cottidae	MI	V	N	cold
34	Peamouth	<i>Mylocheilus caurinus</i>	GENSPE	Cyprinidae	MT	I	N	cold
95	Perch	<i>Perca sp.</i>	GENUS	Percidae				cool
103	Perch	<i>Percidae</i>	FAMILY					cool
83	Pike	<i>Esox sp.</i>	GENUS	Esocidae				cold
58	Pumpkinseed	<i>Lepomis gibbosus</i>	GENSPE	Centrarchidae	MT	I	I	warm
13	Pygmy Whitefish	<i>Prosopium coulteri</i>	GENSPE	Salmonidae	MI	V	N	cold
25	Rainbow Smelt	<i>Osmerus mordax</i>	GENSPE	Osmeridae	MI	I	I	cold
10	Rainbow Trout	<i>Oncorhynchus mykiss</i>	GENSPE	Salmonidae	II	I	N	cold
40	Redside Shiner	<i>Richardsonius balteatus</i>	GENSPE	Cyprinidae	MI	I	N	cold
78	Salmon	<i>Oncorhynchus sp.</i>	GENUS	Salmonidae				cold
53	Sand Roller	<i>Percopsis transmontana</i>	GENSPE	Percopsidae	MT	I	N	
96	Sculpin	<i>Cottus sp.</i>	GENUS	Cottidae				cold

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Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
70	Shorthead Sculpin	<i>Cottus confusus</i>	GENSPE	Cottidae	MI	I	N	cold
72	Shoshone Sculpin	<i>Cottus greeniei</i>	GENSPE	Cottidae	II	I	N	cold
88	Shiner	<i>Richardsonius sp.</i>	GENUS	Cyprinidae				
69	Slimy Sculpin	<i>Cottus cognatus</i>	GENSPE	Cottidae	MI	I	N	cold
61	Smallmouth Bass	<i>Micropterus dolomieu</i>	GENSPE	Centrarchidae	MI	C	I	cool
106	Smelt	<i>Osmerus sp.</i>	GENUS	Osmeridae				
7	Sockeye Salmon	<i>Oncorhynchus nerka</i>	GENSPE	Salmonidae	II	V	N	cold
39	Speckled Dace	<i>Rhinichthys osculus</i>	GENSPE	Cyprinidae	MI	I	N	cold
86	Squawfish	<i>Ptychocheilus sp.</i>	GENUS	Cyprinidae				
76	Sturgeon	<i>Acipenseridae sp.</i>	GENUS	Acipenseridae				
89	Sucker	<i>Catostomus sp.</i>	GENUS	Catostomidae				
92	Sunfish	<i>Lepomis sp.</i>	GENUS	Centrarchidae				
102	Sunfish	<i>Centrarchidae</i>	FAMILY					
51	Tadpole Madtom	<i>Noturus gyrinus</i>	GENSPE	Ictaluridae	MT	I	I	warm
41	Tench	<i>Tinca tinca</i>	GENSPE	Cyprinidae	TT	V	I	warm
74	Torrent Sculpin	<i>Cottus rhotheus</i>	GENSPE	Cottidae	II	I	N	cold
80	Trout	<i>Salmo sp.</i>	GENUS	Salmonidae				cold
98	Trout	<i>Salmonidae</i>	FAMILY					cold
91	Trout-Perch	<i>Percopsis sp.</i>	GENUS	Percopsidae				
32	Tui Chub	<i>Gila bicolor</i>	GENSPE	Cyprinidae	TT	O	I	warm
31	Utah Chub	<i>Gila atraria</i>	GENSPE	Cyprinidae	TT	O	N	warm
42	Utah Sucker	<i>Catostomus ardens</i>	GENSPE	Catostomidae	TT	O	N	warm

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Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
66	Walleye	<i>Stizostedion vitreum</i>	GENSPE	Percidae	MT	P	I	cool
59	Warmouth	<i>Lepomis gulosus</i>	GENSPE	Centrarchidae	MT	C	I	warm
55	Western Mosquitofish	<i>Gambusia affinis</i>	GENSPE	Poeciliidae	TT	I	I	warm
77	Whitefish	<i>Coregonus sp.</i>	GENUS	Salmonidae				cold
79	Whitefish	<i>Prosopium sp.</i>	GENUS	Salmonidae				cold
63	White Crappie	<i>Pomoxis annularis</i>	GENSPE	Centrarchidae	MT	O	I	warm
2	White Sturgeon	<i>Acipenser transmontanus</i>	GENSPE	Acipenseridae	II	G	N	cold
73	Wood River Sculpin	<i>Cottus leiopomus</i>	GENSPE	Cottidae	II	I	N	cold
65	Yellow Perch	<i>Perca flavescens</i>	GENSPE	Percidae	MI	C	I	cool

Hybrids

Taxon Code	Common Name	Scientific Name	Taxon Level	Family	TV	TG	Origin	Temp. Pref.*
501	Cutthroat Trout (all stocks) X Rainbow Trout	<i>Oncorhynchus clarki</i> X <i>O. mykiss</i>	GENSPE	Salmonidae	II	I	N	cold
502	Brook Trout X Bull Trout	<i>Salvelinus fontinalis</i> X <i>S. confluentus</i>	GENSPE	Salmonidae	II	I	I	cold
503	Brook Trout X Lake Trout (Splake)	<i>Salvelinus fontinalis</i> X <i>S. namaycush</i>	GENSPE	Salmonidae	II	P	I	cold
504	Brook Trout X Brown Trout (Tiger Trout)	<i>Salvelinus fontinalis</i> X <i>Salmo trutta</i>	GENSPE	Salmonidae	II	C	I	cold

* Taxon temperature preference designations are provisional.

TOLERANCE VALUE:

II Highly intolerant
MI Moderately intolerant
MT Moderately tolerant
TT High tolerant

TROPHIC GUILD:

A Parasite
C Carnivore
F Filter feeder
G Generalist
H Herbivore
I Insectivore
O Omnivore
P Piscivore
V Invertivore

ORIGIN:

N Native
I Introduced

TV Tolerance to organic sediment and thermal pollution. (Ohio Environmental Protection Agency 1989; Sigler and Sigler 1987; Simpson and Wallace 1982)

TG Trophic Guild (Ohio Environmental Protection Agency 1989; Sigler and Sigler 1987; Simpson and Wallace 1982)

Origin (Simpson and Wallace 1982)

Appendix J: Aquatic Life Criteria for Toxic Substances ($\mu\text{g/L}$)

Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
Antimony			4300
Arsenic*	$(0.95)360$	$(0.95)190$	6.2
Beryllium			
Cadmium*	$(0.85)e^{(1.128(\ln H)-3.828)}$	$(0.85)e^{(0.7852(\ln H)-3.49)}$	
Chromium (III)*	$(0.85)e^{(0.819(\ln H)+3.688)}$	$(0.85)e^{(0.819(\ln H)+1.561)}$	
Chromium (VI)*	$(0.95)16$	$(0.95)11$	
Copper*	$(0.85)e^{(0.9422(\ln H)-1.464)}$	$(0.85)e^{(0.8545(\ln H)-1.465)}$	
Lead*	$(0.50)e^{(1.273(\ln H)-1.46)}$	$(0.25)e^{(1.273(\ln H)-4.705)}$	
Mercury*	$(0.85)2.4$	0.012	0.15
Nickel*	$(0.85)e^{(0.846(\ln H)+3.3612)}$	$(0.85)e^{(0.846(\ln H)+1.1645)}$	4600
Selenium	20	5	
Silver*	$(0.85)e^{(1.72(\ln H)-6.52)}$		
Thallium			6.3
Zinc*	$(0.85)e^{(0.8473(\ln H)+0.8604)}$	$(0.85)e^{(0.8473(\ln H)+0.7614)}$	
Cyanide(WAD)	22	5.2	220000
Asbestos			
2,3,7,8-TCDD			0.000000014
Acrolein			780
Acrylonitrile			0.66
Benzene			71
Bromoform			360
Carbon Tetrachloride			4.4
Chlorobenzene			21000

Equivalent to 40 CFR 131.36(b)(1), Columns B1,B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
Chlorodibromo-methane			34
Chloroethane			
2-Chloroethylvinyl Ether			
Chloroform			470
Dichlorobromo-methane			22
1,1-Dichloroethane			
1,2-Dichloroethane			99
1,1-Dichloroethylene			3.2
1,2-Dichloropropane			
1,3-Dichloropropylene			1700
Ethylbenzene			29000
Methyl Bromide			4000
Methyl Chloride			
Methylene Chloride			1600
1,1,2,2-Tetrachloroethane			11
Tetrachloroethylene			8.85
Toluene			200000
1,2-Trans-Dichloroethylene			
1,1,1-Trichloroethane			
1,1,2-Trichloroethane			42
Trichloroethylene			81
Vinyl Chloride			525
2-Chlorophenol			
2,4-Dichlorophenol			790
2,4-Dimethylphenol			

Equivalent to 40 CFR 131.36(b)(1), Columns B1,B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
2-methyl-4,6-Dinitrophenol			765
2,4-Dinitrophenol			14000
2-Nitrophenol			
4-Nitrophenol			
3-Methyl-4-Chlorophenol			
Pentachlorophenol	$e^{(1.005(\text{pH})-4.83)}$	$e^{(1.005(\text{pH})-5.29)}$	8.2
Phenol			4600000
2,4,6-Trichlorophenol			6.5
Acenaphthene			
Acenaphthylene			
Anthracene			110000
Benzidine			0.00054
Benzo(a)Anthracene			0.031
Benzo(a)Pyrene			0.031
Benzo(b)Fluor-anthene			0.031
Benzo(ghi)Perylene			
Benzo(k)Fluor-anthene			0.031
Bis(2-Chloroethoxy) Methane			
Bis(2-Chloroethyl) Ether			1.4
Bis(2-Chloro- isopropyl)Ether			170000
Bis(2-Ethylhexyl) Phthalate			5.9

Equivalent to 40 CFR 131.36(b)(1), Columns B1,B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
4-Bromophenyl Phenyl Ether			
Butylbenzyl Phthalate			
2-Chloronaphthalene			
4-Chlorophenyl Phenyl Ether			
Chrysene			0.031
Dibenzo(a,h) Anthracene			0.031
1,2-Dichlorobenzene			17000
1,3-Dichlorobenzene			2600
1,4-Dichlorobenzene			2600
3,3'-Dichlorobenzidine			0.077
Diethyl Phthalate			120000
Dimethyl Phthalate			2900000
Di-n-Butyl Phthalate			12000
2,4-Dinitrotoluene			9.1
2,6-Dinitrotoluene			
Di-n-Octyl Phthalate			
1,2-Diphenylhydrazine			0.54
Fluoranthene			370
Fluorene			14000
Hexachlorobenzene			0.00077
Hexachlorobutadiene			50
Hexachlorocyclopentadiene			17000

Equivalent to 40 CFR 131.36(b)(1), Columns B1,B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
Hexachloroethane			8.9
Indeno(1,2,3-cd) Pyrene			0.031
Isophorone			600
Naphthalene			
Nitrobenzene			1900
N-Nitrosodimethyl-amine			8.1
N-Nitrosodi-n-Propylamine			
N-Nitrosodiphenyl-amine			16
Phenanthrene			
Pyrene			11000
1,2,4-Trichlorobenzene			
Aldrin	3		0.00014
alpha-BHC			0.013
beta-BHC			0.046
gamma-BHC	2	0.08	0.063
delta-BHC			
Chlordane	2.4	0.0043	0.00059
4-4'-DDT	1.1	0.001	0.00059
4-4'-DDE			0.00059
4-4'-DDD			0.00084
Dieldrin	2.5	0.0019	0.00014
alpha-Endosulfan	0.22	0.056	2.0
beta-Endosulfan	0.22	0.056	2.0
Endosulfan Sulfate			2.0

Equivalent to 40 CFR 131.36(b)(1), Columns B1,B2 and D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	CMC (Acute) - B1	CCC (Chronic) - B2	Human Health - D2
Endrin	0.18	0.0023	0.81
Endrin Aldehyde			0.81
Heptachlor	0.52	0.0038	0.00021
Heptachlor Epoxide	0.52	0.0038	0.00011
PCB-1242		0.014	0.000045
PCB-1254		0.014	0.000045
PCB-1221		0.014	0.000045
PCB-1232		0.014	0.000045
PCB-1248		0.014	0.000045
PCB-1260		0.014	0.000045
PCB-1016		0.014	0.000045
Toxaphene	0.73	0.0002	0.00075

* Aquatic life criteria are expressed as dissolved concentrations. Conversion factors are in parentheses.

Appendix K: Recreation Criteria for Toxic Substances (mg/L)

Compound	Human Health - D2
Antimony	4300
Arsenic	6.2
Beryllium	
Cadmium	
Chromium (III)	
Chromium (VI)	
Copper	
Lead	
Mercury	0.15
Nickel	4600
Selenium	
Silver	
Thallium	6.3
Zinc	
Cyanide(WAD)	220000
Asbestos	
2,3,7,8-TCDD	0.000000014
Acrolein	780
Acrylonitrile	0.66
Benzene	71
Bromoform	360
Carbon Tetrachloride	4.4
Chlorobenzene	21000

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

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Compound	Human Health - D2
Chlorodibromo-methane	34
Chloroethane	
2-Chloroethylvinyl Ether	
Chloroform	470
Dichlorobromo-methane	22
1,1-Dichloroethane	
1,2-Dichloroethane	99
1,1-Dichloroethylene	3.2
1,2-Dichloropropane	
1,3-Dichloropropylene	1700
Ethylbenzene	29000
Methyl Bromide	4000
Methyl Chloride	
Methylene Chloride	1600
1,1,2,2-Tetrachloroethane	11
Tetrachloroethylene	8.85
Toluene	200000
1,2-Trans-Dichloroethylene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	42
Trichloroethylene	81
Vinyl Chloride	525
2-Chlorophenol	
2,4-Dichlorophenol	790
2,4-Dimethylphenol	

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

Compound	Human Health - D2
2-methyl-4,6-Dinitrophenol	765
2,4-Dinitrophenol	14000
2-Nitrophenol	
4-Nitrophenol	
3-Methyl-4-Chlorophenol	
Pentachlorophenol	8.2
Phenol	4600000
2,4,6-Trichlorophenol	6.5
Acenaphthene	
Acenaphthylene	
Anthracene	110000
Benzidine	0.00054
Benzo(a)Anthracene	0.031
Benzo(a)Pyrene	0.031
Benzo(b)Fluor-anthene	0.031
Benzo(ghi)Perylene	
Benzo(k)Fluor-anthene	0.031
Bis(2-Chloroethoxy) Methane	
Bis(2-Chloroethyl) Ether	1.4
Bis(2-Chloro- isopropyl)Ether	170000
Bis(2-Ethylhexyl) Phthalate	5.9
4-Bromophenyl Phenyl Ether	

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

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Compound	Human Health - D2
Butylbenzyl Phthalate	
2-Chloronaphthalene	
4-Chlorophenyl Phenyl Ether	
Chrysene	0.031
Dibenzo(a,h) Anthracene	0.031
1,2-Dichlorobenzene	17000
1,3-Dichlorobenzene	2600
1,4-Dichlorobenzene	2600
3,3'-Dichlorobenzidine	0.077
Diethyl Phthalate	120000
Dimethyl Phthalate	2900000
Di-n-Butyl Phthalate	12000
2,4-Dinitrotoluene	9.1
2,6-Dinitrotoluene	
Di-n-Octyl Phthalate	
1,2-Diphenylhydrazine	0.54
Fluoranthene	370
Fluorene	14000
Hexachlorobenzene	0.00077
Hexachlorobutadiene	50
Hexachlorocyclo-pentadiene	17000
Hexachloroethane	8.9
Indeno(1,2,3-cd) Pyrene	0.031

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

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Compound	Human Health - D2
Isophorone	600
Naphthalene	
Nitrobenzene	1900
N-Nitrosodimethyl-amine	8.1
N-Nitrosodi-n-Propylamine	
N-Nitrosodiphenyl-amine	16
Phenanthrene	
Pyrene	11000
1,2,4-Trichlorobenzene	
Aldrin	0.00014
alpha-BHC	0.013
beta-BHC	0.046
gamma-BHC	0.063
delta-BHC	
Chlordane	0.00059
4-4'-DDT	0.00059
4-4'-DDE	0.00059
4-4'-DDD	0.00084
Dieldrin	0.00014
alpha-Endosulfan	2.0
beta-Endosulfan	2.0
Endosulfan Sulfate	2.0
Endrin	0.81
Endrin Aldehyde	0.81
Heptachlor	0.00021

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

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Compound	Human Health - D2
Heptachlor Epoxide	0.00011
PCB-1242	0.000045
PCB-1254	0.000045
PCB-1221	0.000045
PCB-1232	0.000045
PCB-1248	0.000045
PCB-1260	0.000045
PCB-1016	0.000045
Toxaphene	0.00075

Equivalent to 40 CFR 131.36(b)(1), Column D2 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirement.

Appendix L: Domestic Water Supply Criteria for Toxic Substances (mg/L)

Compound	Human Health - D1
Antimony	14
Arsenic	0.02
Beryllium	
Cadmium	
Chromium (III)	
Chromium (VI)	
Copper	
Lead	
Mercury	0.14
Nickel	610
Selenium(TR)	
Silver	
Thallium	1.7
Zinc	
Cyanide(WAD)	700
Asbestos	7000000 f/l
2,3,7,8-TCDD	0.000000013
Acrolein	320
Acrylonitrile	0.059
Benzene	1.2
Bromoform	4.3
Carbon Tetrachloride	0.25

Equivalent to 40 CFR 131.36(b)(1), Column D1 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

Compound	Human Health - D1
Chlorobenzene	680
Chlorodibromo-methane	0.41
Chloroethane	
2-Chloroethylvinyl Ether	
Chloroform	5.7
Dichlorobromo-methane	0.27
1,1-Dichloroethane	
1,2-Dichloroethane	0.38
1,1-Dichloroethylene	0.057
1,2-Dichloropropane	
1,3-Dichloropropylene	10
Ethylbenzene	3100
Methyl Bromide	48
Methyl Chloride	
Methylene Chloride	4.7
1,1,2,2-Tetrachloroethane	0.17
Tetrachloroethylene	0.8
Toluene	6800
1,2-Trans-Dichloroethylene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	0.60
Trichloroethylene	2.7
Vinyl Chloride	2
2-Chlorophenol	
2,4-Dichlorophenol	93

Equivalent to 40 CFR 131.36(b)(1), Column D1 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

Compound	Human Health - D1
2,4-Dimethylphenol	
2-methyl-4,6-Dinitrophenol	13.4
2,4-Dinitrophenol	70
2-Nitrophenol	
4-Nitrophenol	
3-Methyl-4-Chlorophenol	
Pentachlorophenol	0.28
Phenol	21000
2,4,6-Trichlorophenol	2.1
Acenaphthene	
Acenaphthylene	
Anthracene	9600
Benzidine	0.00012
Benzo(a)Anthracene	0.0028
Benzo(a)Pyrene	0.0028
Benzo(b)Fluor-anthene	0.0028
Benzo(ghi)Perylene	
Benzo(k)Fluor-anthene	0.0028
Bis(2-Chloroethoxy) Methane	
Bis(2-Chloroethyl) Ether	0.031
Bis(2-Chloro- isopropyl)Ether	1400
Bis(2-Ethylhexyl) Phthalate	1.8

Equivalent to 40 CFR 131.36(b)(1), Column D1 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	Human Health - D1
4-Bromophenyl Phenyl Ether	
Butylbenzyl Phthalate	
2-Chloronaphthalene	
4-Chlorophenyl Phenyl Ether	
Chrysene	0.0028
Dibenzo(a,h) Anthracene	0.0028
1,2-Dichlorobenzene	2700
1,3-Dichlorobenzene	400
1,4-Dichlorobenzene	400
3,3'-Dichlorobenzidine	0.04
Diethyl Phthalate	23000
Dimethyl Phthalate	313000
Di-n-Butyl Phthalate	2700
2,4-Dinitrotoluene	0.11
2,6-Dinitrotoluene	
Di-n-Octyl Phthalate	
1,2-Diphenylhydrazine	0.04
Fluoranthene	300
Fluorene	1300
Hexachlorobenzene	0.00075
Hexachlorobutadiene	0.44
Hexachlorocyclo-pentadiene	240
Hexachloroethane	1.9

Equivalent to 40 CFR 131.36(b)(1), Column D1 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

Compound	Human Health - D1
Indeno(1,2,3-cd) Pyrene	0.0028
Isophorone	8.4
Naphthalene	
Nitrobenzene	17
N-Nitrosodimethyl-amine	0.00069
N-Nitrosodi-n-Propylamine	
N-Nitrosodiphenyl-amine	5
Phenanthrene	
Pyrene	960
1,2,4-Trichlorobenzene	
Aldrin	0.00013
alpha-BHC	0.0039
beta-BHC	0.014
gamma-BHC	0.019
delta-BHC	
Chlordane	0.00057
4-4'-DDT	0.00059
4-4'-DDE	0.00059
4-4'-DDD	0.00083
Dieldrin	0.00014
alpha-Endosulfan	0.93
beta-Endosulfan	0.93
Endosulfan Sulfate	0.93
Endrin	0.76
Endrin Aldehyde	0.76

Equivalent to 40 CFR 131.36(b)(1), Column D1 adopted December 22, 1992 as modified by Section 250.07 of IDAPA 16.01.02 Water Quality Standards and Wastewater Treatment Requirements

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Compound	Human Health - D1
Heptachlor	0.00021
Heptachlor Epoxide	0.00010
PCB-1242	0.000044
PCB-1254	0.000044
PCB-1221	0.000044
PCB-1232	0.000044
PCB-1248	0.000044
PCB-1260	0.000044
PCB-1016	0.000044
Toxaphene	0.00073

Appendix M: *Example Memorandum to Change Designated Beneficial Uses*

MEMORANDUM

To: Regional Administrator

From: Assessor

Date:

Subject: Candidates for new or modified designated beneficial uses

Attached are copies of the Water Body Assessment Form(s) for water bodies processed through the 1996 Water Body Assessment Guidance with data collected during the _____ season. The following water bodies were found to require new designated uses or changes to existing designated uses.

Water Body Name	New Designations	Old Designations (if applicable)

cc: Water Quality Standards Coordinator, Central Office

Appendix N: *Example Memorandum to Appeal Beneficial Uses Status or Attainability Determinations*

MEMORANDUM

To: Regional Administrator

From:

Date:

Subject: Beneficial uses status or attainability determinations appeal

Attached are data that justify an appeal of the DEQ beneficial uses status or attainability determinations processed through the 1996 Water Body Assessment Guidance with data collected during the _____ season. Additional data for the following water bodies indicate modification to beneficial uses status or attainability determinations may be required.

Water Body Name	Beneficial Uses Status or Attainability Determinations	Modified Beneficial Uses Status or Attainability Determinations

cc: Watershed Monitoring and Analysis Bureau, Central Office

Appendix O: *Example Memorandum for Listing Water Quality-Limited Water Bodies 303(d)*

MEMORANDUM

To: Regional Administrator

From: Assessor

Date:

Subject: Candidates for listing as water quality-limited (303(d))

Attached are copies of the Water Body Assessment Form(s) for water bodies processed through the 1996 Water Body Assessment Guidance with data collected during the _____ season. The following water bodies were found to be "Not Full Support" for one or more designated or existing beneficial uses.

Water Body Name	Use(s) Impaired	Status (Not Full Support)

cc: Water Quality Standards Coordinator, Central Office

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